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10 CENTS

Commercial Self-Propelled Vehicles.

Consideration of the Advantages of the Motor Wagon Over Horse Drawn Vehicles with
Details of a Proposed Type of Steam Commercial Vehicles.

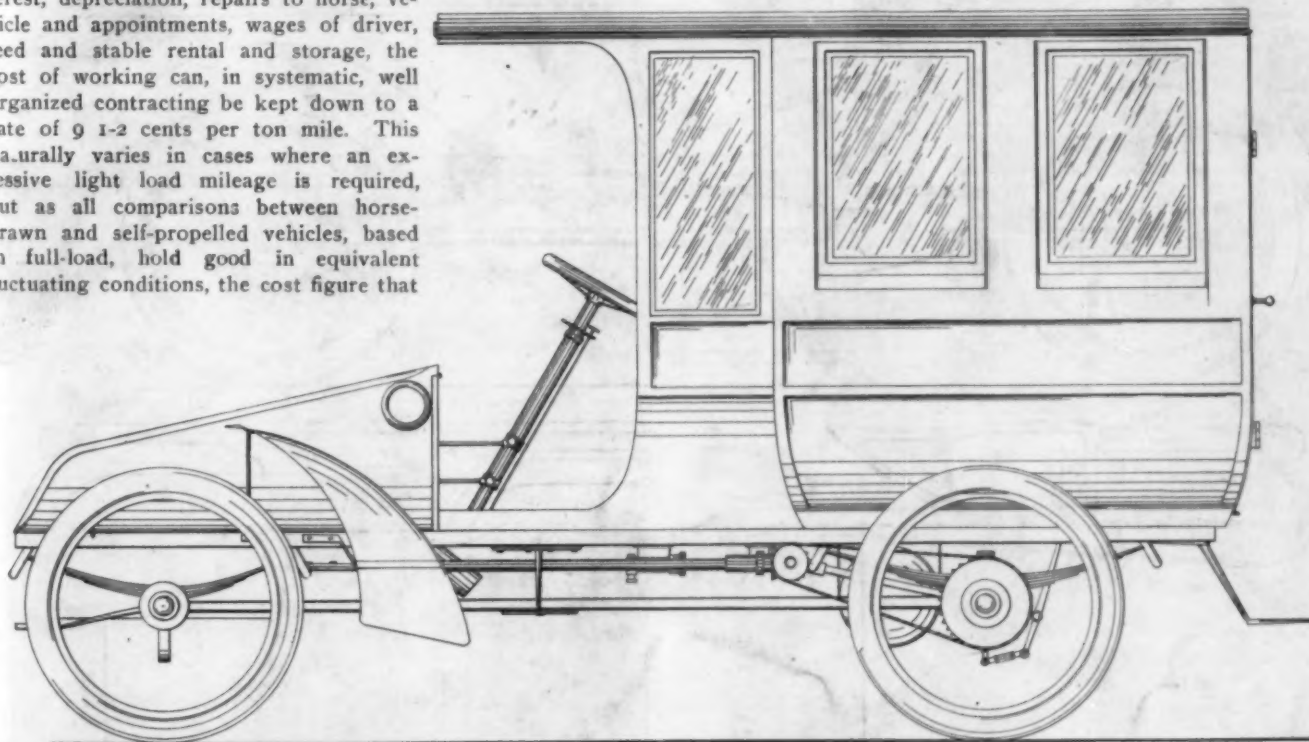
BY WALTER L. BODMAN.

It is generally accepted among contractors that a good horse on fairly good roads has a working capacity for 300 day in the year of 36 ton miles per day, and that in such work he has 5 years of effective service. Including all charges, interest, depreciation, repairs to horse, vehicle and appointments, wages of driver, feed and stable rental and storage, the cost of working can, in systematic, well organized contracting be kept down to a rate of 9 1-2 cents per ton mile. This naturally varies in cases where an excessive light load mileage is required, but as all comparisons between horse-drawn and self-propelled vehicles, based on full-load, hold good in equivalent fluctuating conditions, the cost figure that

cent. per annum. This repair item is, of course, included in getting the 9 1-2 cent rate.

Commercial self-propelled vehicles will have an assured *raison d'être* when they replace horse work at the same cost per

filling the conditions of horse replacement economically, although so far this has been completely kept out of sight in all discussions of the subject, and it has been assumed that economical working lies only in the very heavy vehicle. The



ONE OF THE STYLES OF BODY (PASSENGER BUS) TO BE USED ON PROPOSED COMMERCIAL STEAM VEHICLES.

rules in the best working cases is the one to deduce calculations from.

Such a horse, vehicle and appointments have a prime cost of \$500 and are subject as above stated to a depreciation of 20 per cent. per annum.

In addition, the repair item is allowed to approximate the same amount, 20 per

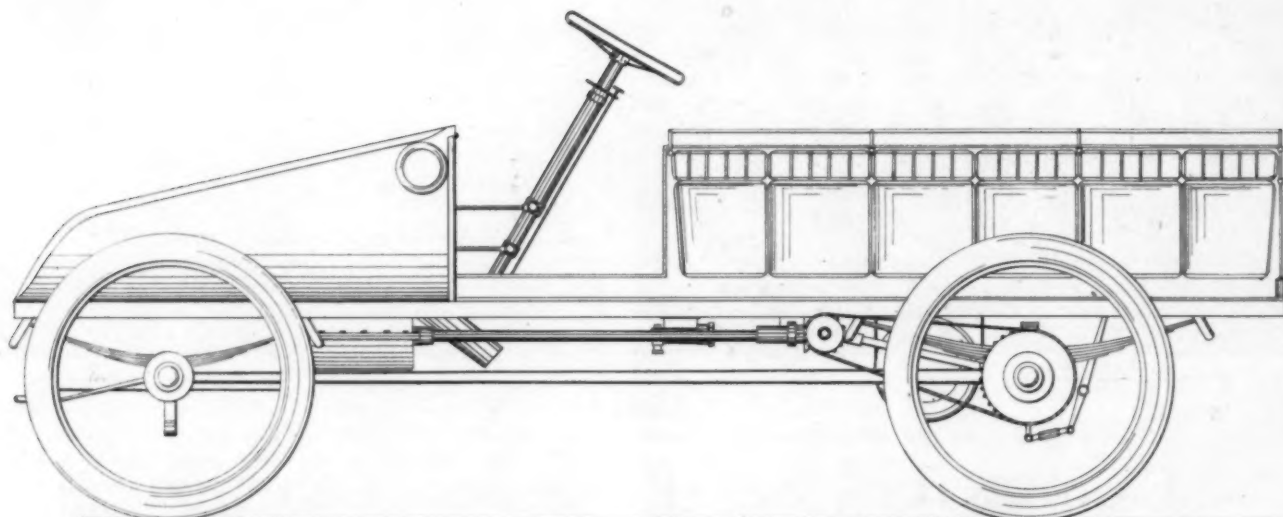
ton mile, by reason of the many sanitary and organization advantages they possess, and they will absolutely dominate the field when in addition they prove their ability to economize on cost.

The most debatable ground in the future discussion of this subject will be the size and class of vehicle most capable of

accompanying ton mileage diagram is based on actual running experience of different systems of trucks.—See page 274. This gives for a 2,000 lb. car, 12 ton miles per hour.

This gives for a 4,000 lb. car, 16 ton miles.

This gives for a 6,000 lb. car, 18 ton miles.



BODMAN CHASSIS FITTED WITH EXPRESS DELIVERY WAGON BODY—LOAD 2,000 POUNDS

This gives for a 8,000 lb. car, 20 ton miles.

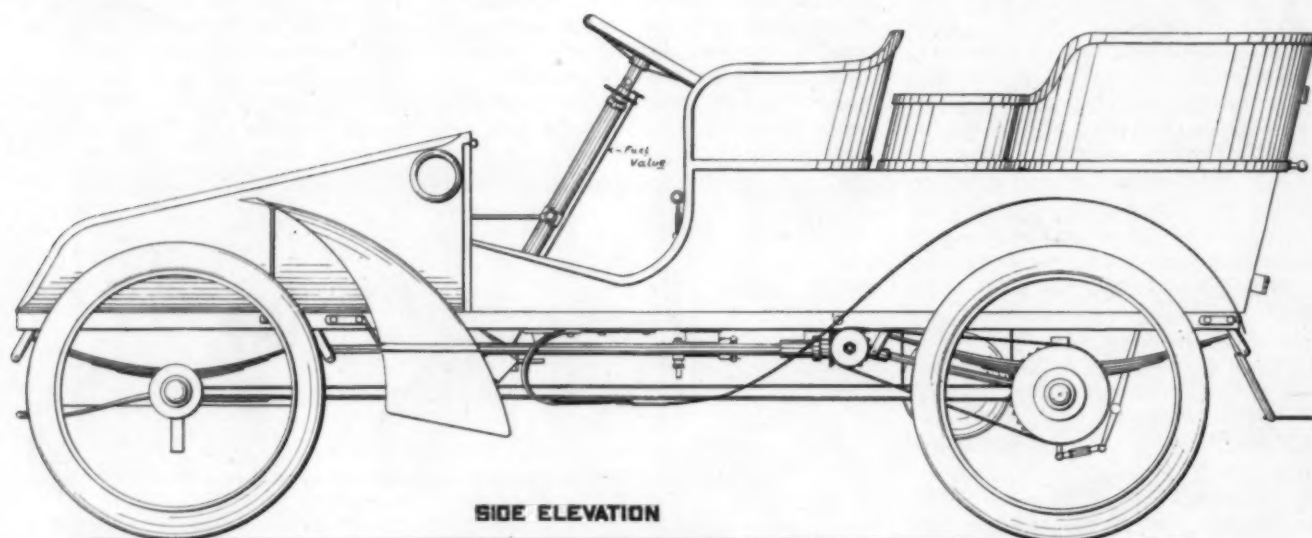
This gives for a 10,000 lb. car, 20 ton miles.

This gives for a 12,000 lb. car, 18 ton miles.

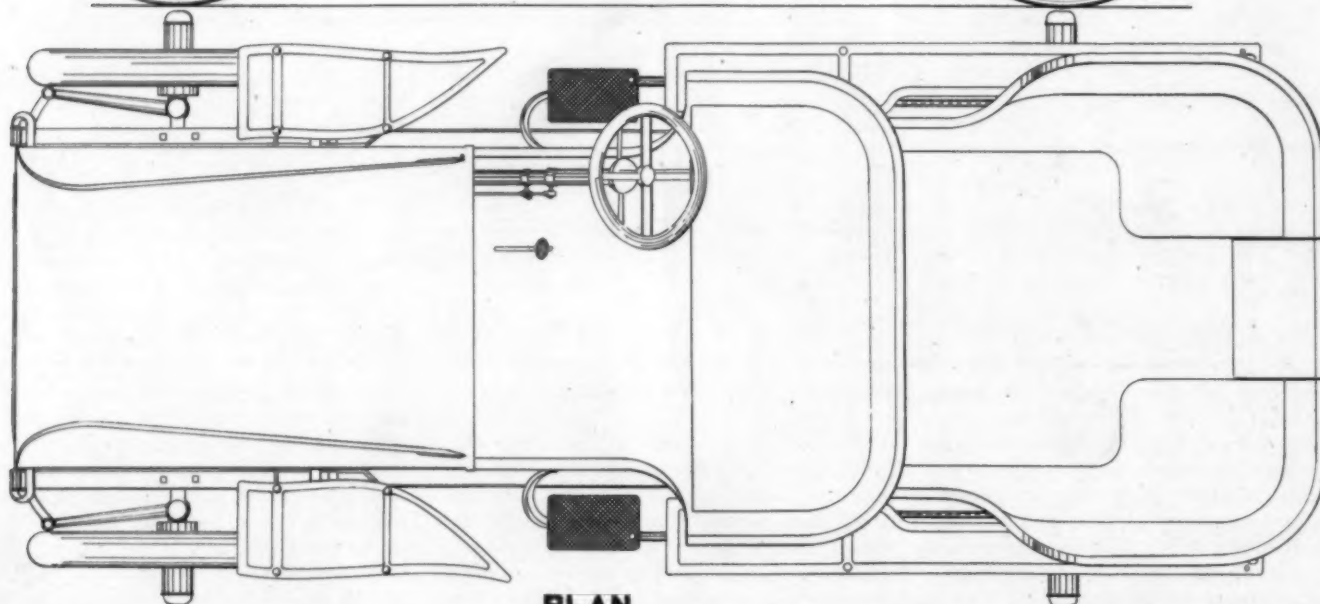
These results are based absolutely on the writer's running experience, and they

are borne out by careful analysis of all collected data, trials, etc.

The 1 ton vehicle is debarred by legislative and traffic conditions from making



SIDE ELEVATION



PLAN

BODMAN CHASSIS FITTED WITH TOURING TONNEAU, CONVERTING COMMERCIAL VEHICLE INTO PLEASURE CARRIAGE

an economical record, and loads below 1 ton tell against economy.

It is self-evident that, certainly for city conditions, the 4,000 lb. is the most desirable, and by reason of the ease in handling of the vehicle, probably the most economical car in this list.

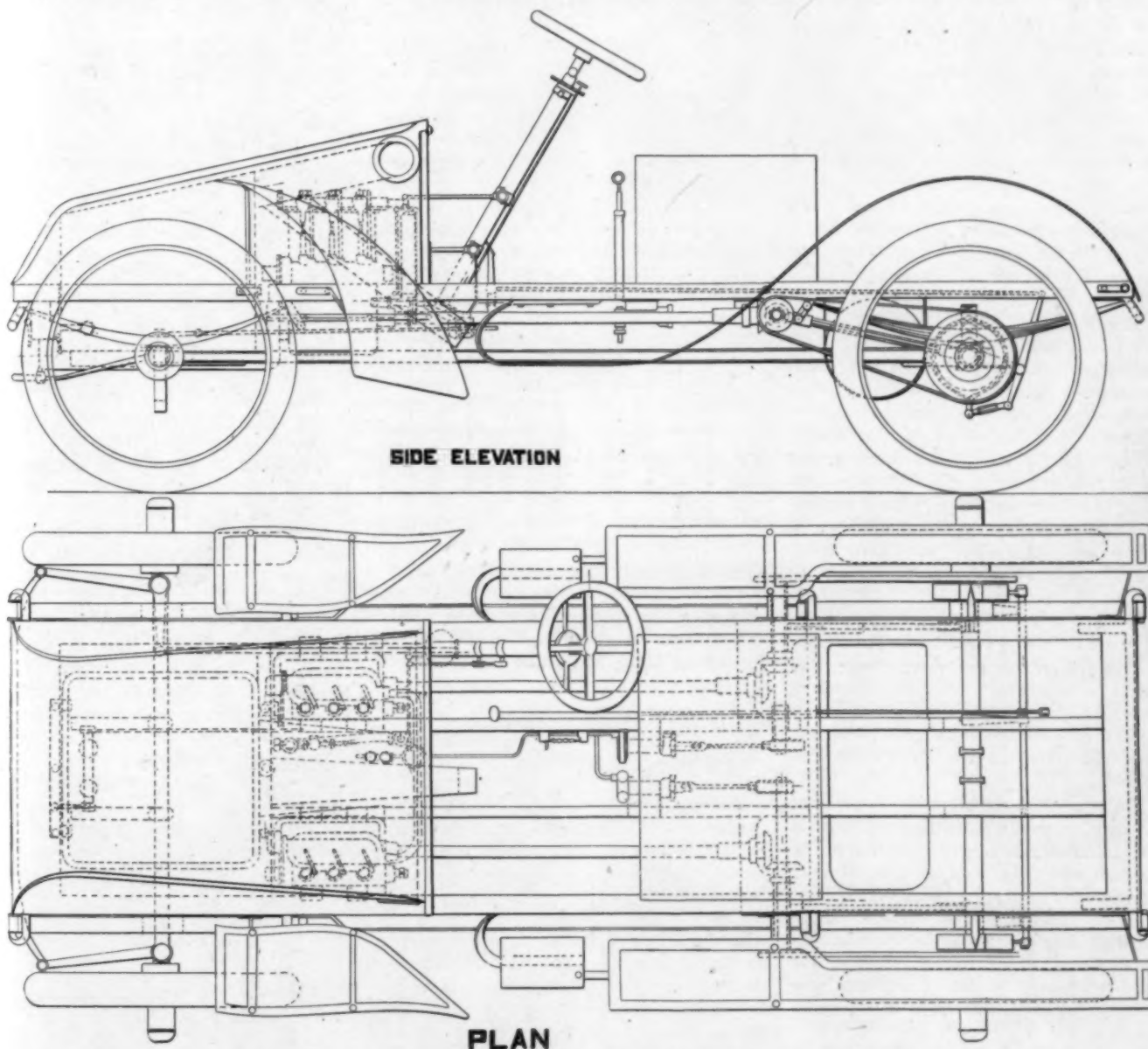
Truck builders are well aware that a truck whose net weight, without fuel or water, is less than the load carried, is an extremely difficult proposition to design, in fact, the designer must make up his

afford a platform area equal to the average capacity allowed for 2 ton horse vehicles, and use a general arrangement, and mechanical details that are more theoretically accurate than can be found on any self-propelled vehicle now working. The general arrangement for such a vehicle is shown in the illustrations of the working drawings of the chassis published herewith, and of 3 types of body such a chassis is capable of carrying.

Assuming the commercial vehicle for

that condition, and can readily be made to do it at a fair profit to the builder.

Describing the chassis in detail, it will be noted that the general arrangement possesses three distinct characteristics, (a) the whole of the motive machinery is placed over the front axle and away from the load area, (b) single acting engines are employed for the power, (c) the engine power, and, in fact, the entire mechanism, excepting the generator is duplicated on each side of the car, and each side is suffi-



BODMAN CHASSIS FITTED WITH TWIN SINGLE ACTING STEAM ENGINES OF 17 COLLECTIVE HORSE-POWER.

mind that he will have to make a sacrifice to obtain that result, either in the use of materials involving increased cost, or by an increase in the chances of rapid wear.

But in the list of loads given here, the truck most suitable for so designing is the 4,000 pound vehicle.

By careful consideration an experienced man can without the use of aluminum or any fanciful or freak creations keep such a truck down to 3,500 pounds tare weight,

most economical practice to be a 4,000 pound load car, and to have a normal average speed of 9 miles an hour, we obtain a ton mileage for 6 running hours per day of 100 ton miles, or 3 times the horse work. Therefore the first consideration to a buyer, of not increasing the capital involved in his plant, must be met by making him a complete truck for \$1,500, or the price of 3 horse teams.

The chassis shown is designed to fill

ciently powerful to drive the car under normal conditions.

The particular type of generator shown is for a "flash" system, but the writer has used this arrangement with plain wet boilers of the fire-tube type, the valuable feature of the location of engine and boiler in front being that all pipes, guages, etc., are in a chamber that is maintained at a good temperature, and absolutely prevents any possibility of a

freeze up in zero weather. The gauges being in front of the operator, and protected from wind and rain, are easy to reach and not liable to breakage, the first gauge glass used on a vehicle of this type working for 12 months in Buffalo without breakage or trouble.

The position shown allows the easy use of kerosene as a fuel, a *sine que non* for a rational steam commercial vehicle, as it is possible to see the fire at all times; a necessity of design, that no amount of "automatic" devices should allow the careful designer to overlook.

The engines used are poppet valve cam actuated single acting engines, vertical, with 3 cylinders acting at 120 degrees; arranged "fore and aft" to drive main shafts transmitting through bevels to short way shafts, carrying on their outer ends sprockets gearing down to the road wheels. The cam, poppet valve single acting inclosed engine is the ideal corollary of the flash boiler, which is the ideal power of generator of the future.

From experience and tests the writer knows that the engine here advocated will give a brake horse power hour on a consumption of 47 pounds of wet steam as supplied by a firetube boiler, or practically double the efficiency that can be obtained from the best link type double acting engine of less than 10 horse power build. An engine of this type was used on a small car weighing, with 2 passengers, 1,850 pounds, continuously for 12 months making a distance of 8,000 miles, and was only once opened up for examination.

In the first week of its running, a careful 100-mile test gave a water consumption of 7.4 pounds per vehicle mile, and the same test over the same ground 12 months later gave a consumption of 7.6 pounds, proving the valve gear of the engine had remained absolutely unaltered by wear.

The utility of a double drive, in place of a single engine transmitting through a differential may be open to question in the minds of many manufacturers, but the experience of 7 or 8 years, with the heaviest of trucks and the lightest of vehicles, using both single and double engines, has disposed the writer to believe that, for commercial vehicles, where a cheap form of engine is used, this drive will become standard.

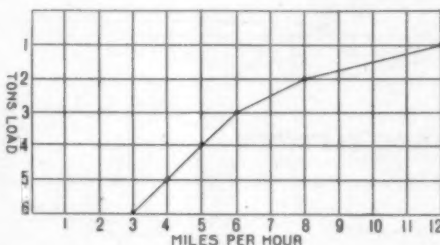
Starting, turning, braking on the reverse are all smoother and more certain under bad conditions, by the large, steady piston effort for starting, and the evenness of its application. A very simple device, decidedly more simple and safe than locking the differential, enables one to couple the engines, and the starting then on wet, soft turf becomes a possibility. The designing of this system, which is the result of several years' development and not of any particular inventive faculty, has had for its object the attainment of a high

standard of simplicity by eliminating the "mysteries" of packing lands, setting up brasses, adjusting valve gears and so on and so on, the production of an arrangement for giving absolute accessibility at all times, and the obtaining of a low prime cost that should ensure the building of a commercial vehicle.

A low prime cost necessarily ceases to be a virtue unless accompanied by low upkeep, or at any rate no increase of upkeep due to cheaper construction, and also to an immunity from excessive risk of breakdown.

The first essential to low upkeep and immunity from breakdown is the use of a resilient tyre, ensuring a minimum of vibration and jolt, a maximum of adhesion and noiselessness at high speed.

Four years ago the writer made costly attempts to work rubber tires for 3 and 4-ton trucks, say 17,000 pounds gross load, using tires up to 8 inches wide. The conclusion reached was that it was not commercially possible then to use a rubber tire exceeding 4 inches in width, owing to



TON MILEAGE DIAGRAM—See front page.

the enormous percentage of loss (nearly 70 per cent.) of the section of the tire required for fixing and which was not available for wear.

The writer has not seen since then any method that reduces that lost area, and therefore assumes 4 inches as the widest commercial tire to-day.

Experiments made on a 36-inch wheel with a nearly square section tire 4 inches wide and 1 7/8 inches deep gave a bearing surface practically all under load of 10 square inches. On a machine constructed to allow variable loads for testing, such a tire could be run at a speed of 8 miles an hour and a load of 250 pounds per square inch or 2,500 pounds per tire for 12 hours continuously without undue heating, but increases above that load caused very visible rises of temperature and gradually flaking of the tire until large strips would tend to come off.

This is an additional argument in favor of the 2-ton vehicle as the limit of usual commercial load, as on a 4-inch tire that would only give a total gross load of rather more than 200 pounds per square inch.

In future issues, details of the type of engine employed will be given together with the results of actual tests of vehicles of the type here advocated.

TO PREVENT SHORT OIL PIPES ROBBING LONG ONES.

At one of the social meetings of the Automobile Club of Great Britain and Ireland Thomas Clarkson, best known here in connection with the Clarkson kerosene burner for steam vehicles, read a paper on lubrication which was received with appreciation though not with unqualified approval by other members of the industry. Some of the most important statements made are given in substance in the following:

"Lubrication is of such primary importance that a machine with defective lubrication, however perfect otherwise, cannot be described as well made. This applies with special force to an automobile, and investigation of this point will well repay an intending buyer. So much pleasure is lost, and the depreciation in value of a car is so rapid by imperfect lubrication that the importance of good lubrication cannot be easily over-estimated.

"One of the most essential points in lubricating devices relates to the means of securing the most reliable lubrication with the smallest attention on the part of the driver. Forms of lubricators are simply innumerable, and much ingenuity has been displayed in their construction.

"Speaking broadly, there are two systems of lubricating a bearing. In the first the rate of feeding is adjusted as far as practicable to the actual requirements. In the second the bearing is liberally flooded, and the large surplus recovered for use again.

"It would not serve my purpose to attempt to describe the innumerable forms of lubricators which come under the first category, all of which depend individually for their action upon human adjustment, since I am entirely opposed to such human adjustment and individual inspection. The long rows of sight-feed drips which are sometimes seen on a dashboard are veritable instruments of torture, and it is perfectly unreasonable to expect the driver to look at them. With such an instrument the poor driver is between Scylla and Charybdis—either he must largely over-feed or risk a stoppage and a ruined bearing.

"The quantity of good oil necessary to maintain a film between the working faces of a well-constructed bearing is really very small indeed. To approximate the rate of feed to this small quantity means a very small drip outlet; and a very small drip outlet means that a tiny particle of dirt or extra thick oil will stop the supply altogether. To avoid this the feed is habitually extravagant, and the cost for wasted lubricating oil may easily be ten or more times of what is actually used.

"The system of liberally flooding the bearings and recovering the surplus implies that all the bearings are effectively enclosed, not merely to exclude dust, but

to catch the surplus oil and collect it in a common reservoir.

"The oil may be supplied to the bearings either by the splashing of the mechanism in a bath of oil, or the oil may be pumped over the bearings. Both ways have the advantage of starting and stopping the lubrication simultaneously with the running of the machinery, and without the intervention of the driver, which is a correct principle. The waste of oil is extremely small (if the case is made properly), and consequently the best quality does not become an expensive item, one gallon often lasting for a thousand miles.

"Splash lubrication answers well in some cases, where all of the bearings are in a position to benefit by the splash distribution; but this is not always the case, and the violent agitation of the body of oil tends to preserve in suspension any fine solid particles, either of dirt or metal, which should be allowed to settle.

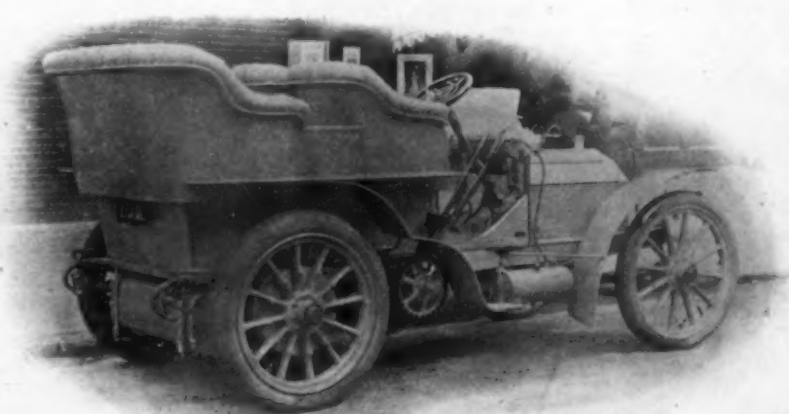
"For these reasons I advocate pumping the oil under pressure. A force pump working under the extremely favorable conditions of dealing with lubricating oil will run for years without attention; and its action may be instantly tested at any time when running by momentarily pressing a button.

"The next step is to insure that the oil which is pumped is going to all of the bearings. On an automobile I do not advocate a separate pump for each bearing. One pump for all the bearings is enough, only we must be sure they all get a proper share.

"One arrangement is for the pump to deliver the oil into a distributing main, fitted with branch pipes, which connect with the several bearings. The objection

take their brother's share. Or, if some of the branch pipes are longer than others—which is practically inevitable—the short ones take more oil than the longer ones.

is covered by a circular disc, which is slowly revolved by the motor. On one side of the disc a segment is cut out, so as to uncover one hole at a time, and the



REAR VIEW OF FRANK GOULD'S AUTO—ROI DES BELGES BODY.

This means that the circulation in the larger pipes is less vigorous, and this is the first step to becoming sluggish, and finally stopping altogether.

"Such an attempt at equal sharing or communism must fail, and I can only see one effectual remedy for it, namely, to compel each of the branch tubes in turn to take the whole of the oil delivery for a fraction of the time, instead of attempting to take a fraction of the delivery all the time. From this conclusion—which, it will be noted, professes nothing more than ordinary common sense—it is a short step to construct such a distributor.

"A distributor which I have found to answer perfectly and give no trouble has

desired result is accomplished. Care is taken to make the segment wide enough to partially open the next hole before closing the last. Any number of branches may be used."

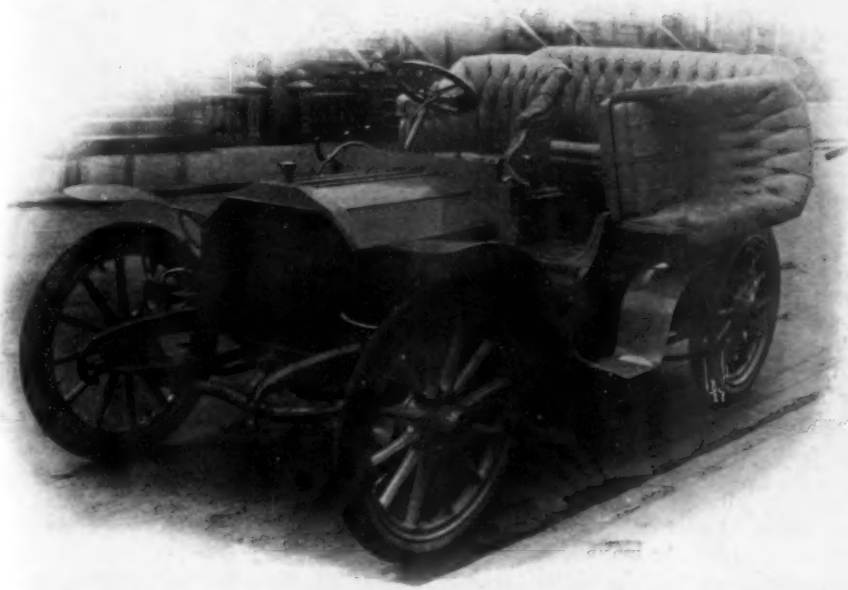
F. J. Gould's New Car.

A handsome automobile body in aluminum has just been imported by Frank J. Gould, of New York. The tonneau has a full phaeton, double roll, Roi des Belges back with individual front seats, one of which may be swung clear, giving entrance to the car from the curb instead of the roadway. With this design the tonneau passengers avoid stepping into the street to enter the car, and the continuous upholstery of the wide back seat is not broken by the door, giving seating capacity for three persons without crowding. This car is painted and upholstered in a dark shade of pearl gray and is one of the first cars in the country to be equipped with the new Criterium speed indicator. Mr. Gould has employed H. Hovey Hill as his driver.

At the Crystal Palace show in England the number of exhibitors was as follows:

Manufacturers of gasoline vehicles....	61
Manufacturers of steam cars.....	14
Manufacturers of electric vehicles....	4
Manufacturers of motor bicycles....	12
Manufacturers of engines, fittings and accessories.....	51
Total.....	142

With the object of securing a collection of automobile novelties, such as horns, speedometers, gauntlets, goggles and similar small articles for exhibition in its rooms for the benefit of its members and visitors, the Automobile Club of America has sent invitations to manufacturers of such novelties asking them to submit samples of their goods for this purpose.



FRANK GOULD'S NEW MERCEDES WITH HINGED FRONT HALF SEAT.

to this is that some of the branch pipes may become fouled after prolonged use, and the rest of the branches will obligingly

a distributing main from which the outlets consists in a ring of holes, each communicating with a bearing. This ring of holes

Motor Boats and Marine Motors at the Madison Square Sportsmen's Show.

BY W. P. STEPHENS.

Motor boats and marine engines formed a more conspicuous part of the display of sportsman's equipment at the Ninth Annual Sportsmen's Show in Madison Square Garden, New York, than at previous shows. In fact the main floor of the Garden contained few of the usual stands of guns, fishing tackle and similar gear which were formerly to be found there, and much of the space thus available for other uses was occupied by the motor boat exhibitors. The whole center of the main floor was given up to the miniature lake, where aquatic sports attracted large audiences daily, and where a performance by a band of Ojibway Indians was aided by a bit of wild country cleverly imitated in canvas and evergreens on a large stage at the end of the lake and on the familiar island in the middle. Marine motors and launches were disposed around the outer edge of the main oval on the floor and in the balconies.

With all its prominence as a yachting center, New York affords but little in the way of nautical exhibitions, the Sportsmen's Show being the best, a fact known to both exhibitors and visitors. It should be possible to hold an annual yachting exhibition at the Garden which would attract yachtsmen from Boston, Philadelphia and more distant points, but nothing in this line has as yet been attempted, and until it is the annual Sportsmen's Show must fill its place.

The present show, which opened February 21, discloses little of startling novelty in motors or yachts; the motors are, with a single exception, gasoline of the ordinary two and four-cycle types, with make-and-break ignition. An improved quality of work is noticeable and there is distinctly more attention paid to the important subject of lubrication, but in the main the conventional lines are followed. There is no indication of any change in the standard marine motor, as known here for some years past, in directions indicated by the latest advances in motor car engineering.

LOZIER MOTOR CO.

One of the interesting features of the marine exhibit is the cabin launch shown by the Lozier Motor Company, under the very appropriate name of *Peek In*. The interior, which is accessible by a special ladder from the floor, is lighted for the occasion by electric bulbs attached to the candle lamps which would be used in cruising, the current being taken from the Garden wires. The hull is of the model so successfully introduced by this company within the past two years, the bow straight, almost convex, with a very clean run end-

ing in a sharp stern with moderate overhang. There are no hollow lines, but all the fore and aft lines are perfectly fair sweeps of moderate curvature. There is no attempt to cut the water with a thin knife-like bow such as might be necessary to force a way through cheese or thick treacle, but the underwater body is a half of such a fair spindle as might be turned out in a lathe, the fore end displacing the water easily and naturally, while the after end admits of a rapid displacement. The practical tests of this model in many sizes of open and cabin launches during the past season have justified all that is claimed for its speed and general good qualities. The stem is plumb and there is ample free board amidships, with a moderate sheer. The dimensions are. Length over all, 35 feet 8 1-2 inches; water line, 33 feet 6 inches; breadth, 7 feet 6 inches; draught, 2 feet 3 1-2 inches. The hull is hand-somely finished, the wales as well as the planksheers and decks being entirely of mahogany, the oak rubbing strip is faced with brass, protecting the sides in locks and when lying at a dock; the topsides below this strip are enameled in white.

The cabin house is also of mahogany, even to the paneling of the ceiling and the fittings of the galley. The forward saloon and pilot house has windows of bevelled plate on all sides and is fitted with two transoms with a convenient form of extension front, making two berths by night. The upholstery and hangings are of a rich green, which harmonizes well with the mahogany. Immediately abaft the saloon is a toilet room with fixed marble basin and water closet to port and a small galley with pantry, icebox and shelf for kerosene stoves to starboard. The motor, a 10 horse power two-cycle, is installed aft in the center of a large cockpit, also under the cabin roof, and fitted with curtains on the sides. Every inch of space is utilized, there are two clothes lockers just abaft the saloon and the sides of the cockpit and the space in the run are fitted as closets or drawers. The screw is of the reversing type, of bronze with shoe of the same metal. The launch is fitted for ordinary day use, giving good shelter in bad weather, and also for cruising; though the accommodations are necessarily limited. Two persons can live comfortably in the saloon, while the paid hand, who will cook as well as attend to the motor, has the enclosed cockpit to himself by night.

One of the company's standard two-cycle motors of 15 horse power is shown on the floor, but this type is already well known. What is of much greater interest is the new four-cycle motor of 18 horse

power which stands by the bows of the launch. Heretofore the Lozier motor has been exclusively of the two-cycle type, but the company has been engaged for four years past in experiments in four-cycle motors. No attempt has been made to put them on the market until this could be done with the certainty that they would from the start compare favorably with all other existing makes. The new machine, both in design and workmanship, gives evidence of this long preparation. The two cylinders with the entire water-jacket are in a single casting, self-contained and requiring only the connecting pipes for mixture and exhaust; the cylinder heads are also in one single casting, fitted with an eyebolt for hoisting. The crank-shaft has a central bearing between the cranks. All the mechanism is within the crank-case; the time-shaft is driven by spur gears from the main shaft, being parallel to and a little above the latter. The valve mechanism is located just above the main shaft and between the two connecting-rods. The controlling devices are very complete, including the spark advance, automatic governor and throttle. A small lever outside the crank-case serves to throw off the compression in starting. The motor gives 18 horse power under normal conditions, but when under way the governor may be cut out by a small lever, giving 20 to 21 horse power. A Lozier magneto is attached to the crank-case, being driven by a bicycle chain from the main shaft; the pump is located abaft the motor, bolted to the crank-case just below the main shaft and driven from it in the same manner. The two thrust-rings are fitted with ball-bearings and with adjusting nuts with a special locking device similar to that used on bicycle bearings. The after end of the main shaft is fitted with a universal joint of solid construction. The motor is of moderate dimensions and very compact form, the piping being reduced to a minimum and practically all parts being within the main castings; the weight is 2,050 pounds.

The smaller motors are shown at a second stand further along the aisle, where there is also an open launch, 21 feet 6 inches over all, with a 3-horse power motor. This boat has the torpedo stern of slightly different form from the larger one, and is finished in mahogany, with white topsides. In front of her are shown the standard two-cycle motors of 11-2, 3, 5 and 7 1-2 horse power. All the motors are finished in nickel-plate with black enamel on the bodies, except the four-cycle, which shows up well in a coat of rich red. The 5 and 7 1-2 horse power are fitted with magneto ignition.

RACINE BOAT MANUFACTURING CO.

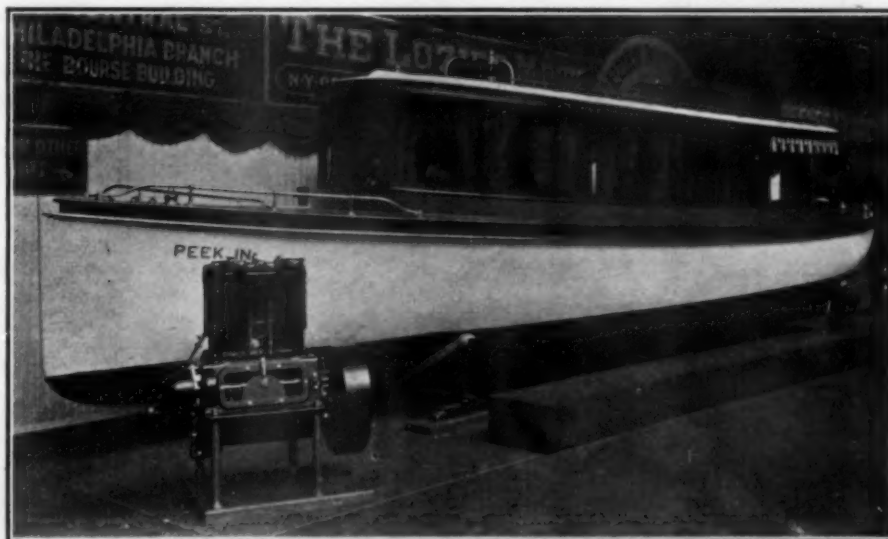
This company, represented in New York by Von Lengerke & Detmold, has the same large space as last year, on the North side of the building. The blocking of the railways by snow delayed the ex-

hibit, which only arrived in New York on Saturday afternoon, entailing much hard work to get it in place by Monday. The principal feature is an auxiliary cruising catboat, the dimensions being: over all, 26 feet 5 inches; waterline, 20 feet; breadth, 8 feet 6 inches; draft, 3 feet; sail area, 450 square feet. The hull is of good model, with plumb stem and moderate but very wide after overhang, the cabin house is low, and the cockpit is rather small, though a good portion of the deck is enclosed by the coaming, forming seats with room for the feet in the cockpit. The outside keel is about 6 inches deep and there is a centerboard, with small trunk in the cabin. A motor of 31-2 horse power is installed beneath the deck between the cabin and cockpit, accessible from the cabin; the wheel is of the reversing type, with two blades. The cabin sleeps four persons on wide transoms. The hull is well built and finished, with cabin house in oak. Steering is by a tiller, the rudder post coming up through the floor of the cockpit.

A 25-foot open launch is also shown, of 6 feet 3 inches breadth and 2 feet 2 inches draft, finished in oak with white topsides; the motor is of 5 horse power. One of the company's "Twentieth Century" 18-foot launches is shown, of 4 feet 6 inches breadth and 1 foot 6 inches draft, with 21-2 horse power motor; finished in oak with white topsides, the decks being of oak and walnut strips. This launch also

abats the center, and the cockpit is forward. A handy fishing launch of 15 feet length and 4 feet breadth, drawing one foot, is driven by a 3-4 horse power motor. The company also builds steam yachts of large size and one of its triple expansion launch engines is shown. In the line of

of the Truscott boats and motors. The 25-foot standard Truscott launch with two-cycle motor of 6 horse power is handsomely finished in cherry. One of the new model 21-foot launches, with sharp stern, finished in oak, is fitted with a 3 horse power motor; there is also a standard 16-



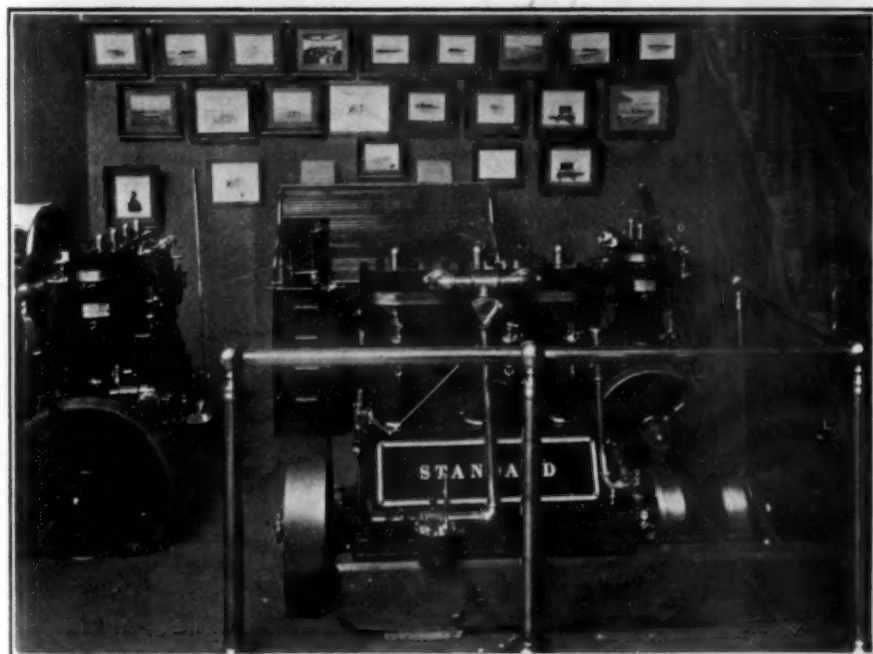
LOZIER 15-HORSE POWER LAUNCH WITH CANOPY, AND 2 CYCLE ENGINE

boats there are two rowing boats, a canoe and a duck boat. Every article in this exhibit carries a neat card giving dimensions, horse power, etc., and prices both in Racine and New York, a matter of great con-

foot launch with 11-2 horse power motor. Two rowing boats and a canoe are shown. The Truscott motors in different sizes, both two and four-cycle, are shown on stands, and a two-cycle motor with part of cylinder and crank case cut away, to show the method of operation, attracts many visitors. Launch fittings of various kinds are shown, including a decided novelty in the form of a boathook for mooring and casting off. A spring snap hook of special construction is fitted with a shank having a square socket, the hole being about 3-8 inch square and 2 inches deep; an eye on the side of the hook serves for the attachment of the mooring line. The boathook has the usual hook on the side, but the straight prong is made square instead of pointed, to fit in the socket in the snap hook. In preparing to pick up a mooring the snap hook is placed on the end of the boathook, where it is held by a spring; forming practically a part of the boathook it may easily be hooked into the ring on the mooring buoy or dock, then a light pull disengages it from the boathook and at the same time releases the snap, so that the hook is firmly locked on the ring. In casting off, the square prong of the boathook is slipped into the shank, unlocking the snap of the hook, which may be freed from the ring.

MILTON POINT SHIPYARD.

This concern has been established for about two years at the old yard, once made famous by David Kirby, where the famous *Arrow* was built in 1874. Its work thus far is in the line of fine launches, sailing boats, and the smaller classes of



STANDARD MARINE ENGINE CO.'S EXHIBIT AT THE SPORTMEN'S SHOW

has an awning. A shoal-draft hunting launch of 18 feet over all length, 5 feet breadth and but 8 inches draft has the screw in a tunnel; the stern broad and square and just touching the water. The motor is of 31-2 horse power, placed just

venience to visitors and saving many unnecessary questions.

TRUSCOTT BOAT MANUFACTURING CO.

Reeves & White, Port Richmond, Staten Island, New York agents, show a number

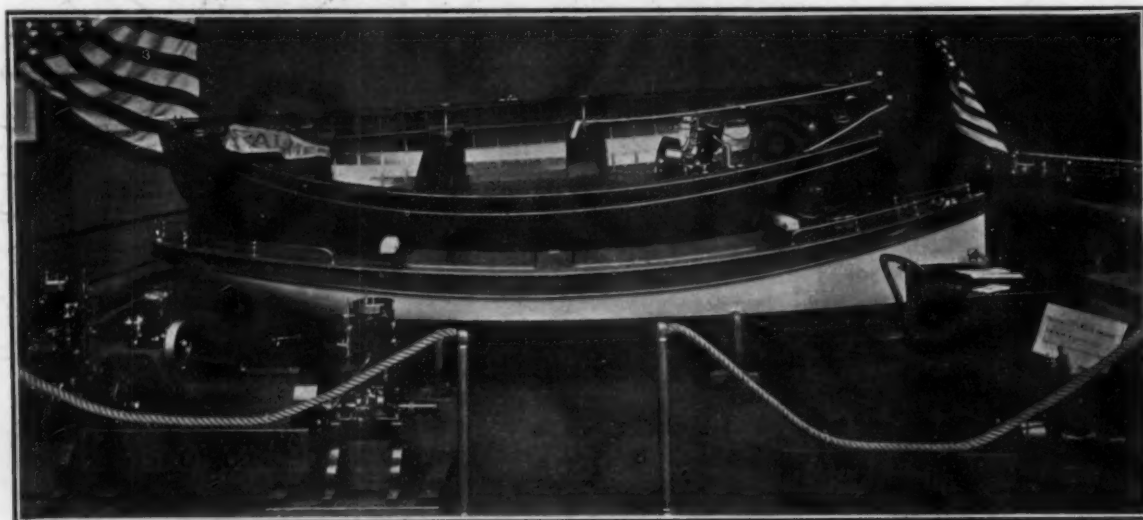
yachts. It builds no motors but handles the Fairfield motor, made in Bridgeport. It has a stand at the extreme end of the South balcony, where the sail of a catboat attracts attention from all points. This boat is from a design by C. D. Mower, of *The Rudder*, for a one-design class, 18 feet over all, 11 feet waterline, 6 feet breadth and 6 inches draft without board. The hull is well built and the spars and rigging are very neat. An open launch is shown, 16 feet over all, 4 feet 8 inches breadth and 2 feet depth, fitted with a 3 horse power motor, two-cycle. The hull is very handsomely finished in mahogany, even to the floor boards. The planking, planksheer and deck are of this wood, with wales of quartered oak. Another 16-foot launch of less elaborate finish but excellent workmanship, with 1 1-2 horse power motor, is also shown. An open launch of 13 feet over all, with 4 feet breadth, is

ranging from 200 up to 1,200 revolutions. The motor is small and compact and well fitted for a yacht's dinghy or similar small boat. The new motors have a special oil cup for the crank case and in addition the wrist-pin and connecting-rod are hollow, a special groove in the piston collects the oil and leads it through the wrist-pin and connecting-rod to the main bearing. A brass cap over the cylinder-head, giving a pleasing finish, is one of the recent additions to the motor. The first Palmer motor, built nine years ago and still in regular service in a launch used for towing boats at the works, is also shown.

CHAS. A STRELINGER CO.

As a detail of its very large business in tools and machinery this company has for years dealt in gasoline motors, both stationary and marine. Two years ago it put out a motor of its own, designed by

in starting and at the same time retards the spark, operating on all the cylinders of the motor. Splash lubrication is used and a patent has been granted on a special casting, a rectangular reservoir, which forms the base of the crank-case. This reservoir is divided by transverse bulkheads, according to the number of cylinders. In the four-cylinder motors there are three bulkheads, making four compartments, the after one being the lowest, owing to the pitch of the motor and shaft. Under ordinary conditions the oil would accumulate at the after end of the case, but in dripping down the side it strikes a gutter, cast solid with the case, which leads it to the second compartment. The drip from this is carried by a second gutter to the third, and so on to the fourth, where it falls into an opening which conducts it through a closed channel to the after compartment. In this way



PALMER BROS. 17-FOOT LAUNCH AND 15-FOOT YACHT TENDER AT THE N. Y. SPORTSMEN'S SHOW.

finished in oak for wales, thwarts, floor boards and grating; she has a motor of 1 1-2 horse power. One of the Fairfield motors of but 3-4 horse power, the "Bull Pup," is shown on a stand; a very compact little machine.

PALMER BROS. STAND.

Two of the Palmer launches, both open, are shown; the larger is the stock 17-foot launch, with 4 feet 6 inches breadth, fitted with 1 1-2 horse power motor and reversing wheel. The hull is finished in oak, with deck of alternate strips of oak and mahogany; the topsides being white. The smaller launch is a light yacht tender, 15 feet by 4 feet 6 inches, with 1 1-2 horse power motor, the hull planked with cedar and finished with mahogany making a very handsome craft. The weight complete, with hoisting rings, is but 425 pounds. Two separate motors, 3 and 5 horse power, of the regular twocycle type, are shown; with a novelty, a 3-4 horse power motor with jump spark, weighing 70 pounds. The spark can be advanced, the speed

its engineers and built for it by the Leland & Faulconer Manufacturing Company, also of Detroit. The company is a strong partisan of the four-cycle type, building this only, in sizes from 3 to 20 horse power. The 10, 15 and 20 are multiples of the 5, using the same cylinder on enlarged base. The special claims of this motor, which is shown for the first time in the East, lie in the quality of materials and perfection of workmanship. Steel drop-forgings are used wherever possible, and such important parts as the pistons and crank-shafts are finished by grinding in the Brown & Sharp or Norton machines. It is claimed that every part is absolutely interchangeable, being fitted to standard in-and-out gauges. The Brush mixing-valve and igniter are used.

These motors have several special features peculiar to them. The connecting-rods are fitted with a screw adjustment and set screw for the wrist-pin bearing which may be set up without removing the rod. A small lever on the side of the motor opens the exhaust valves slightly

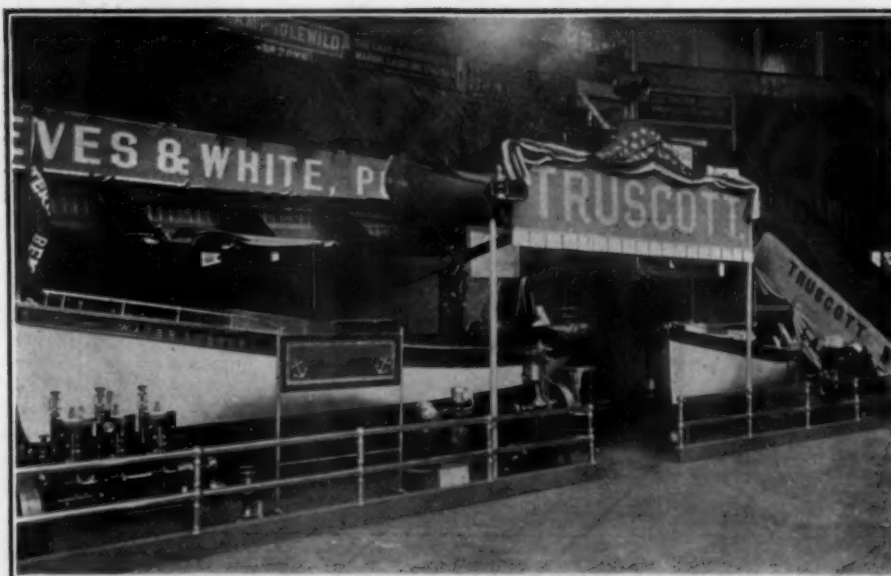
the oil constantly moving and at the necessary level in each crank-pit.

The valve mechanism is within the crank case, but easily accessible while the motor is running. The throttles, on the top of the cylinders, are operated simultaneously by a single lever. With the exception of the 3 horse power, the cylinders and heads, both water-jacketed, are cast in one, and all joints are ground, no packing being used. One of the 3 horse power single and one of the 15 horse power triple-cylinder are shown, with detached parts such as pistons, cylinder and connecting-rods showing details of manufacture.

EAGLE BICYCLE MANUFACTURING CO.

This company, formerly well known in the bicycle business, has adapted its plant and methods to the manufacture of gasoline marine motors of the two-cycle type in sizes up to 6 horse power. One important feature of the motor is the absence of splash lubrication; the main bearings are fitted with bronze sleeves, each

having a longitudinal slot in which a felt wick is fitted, carrying the oil from the cup to the shaft. The crank-pin is lubricated by means of a grease-cup on the outer end of the shaft, which is hollow, the lubricant being forced through the shaft and crank to the bearing. The cylinder is lubricated by means of a sight-feed cup on the side. The crank-case is practically dry, there being no oil or grease to be carried into the cylinder by the gas. The flywheel is so fitted to the shaft as to be instantly removable by means of a wrench. The bearing of the shaft is tapered and the extreme end is threaded; the flywheel being finished with a tapered hole and also counter-bored to receive the boss on the back of a hexagon nut. This boss and its seat are fitted with a groove large enough to receive a 1-4 inch steel ball; and when the nut is in place in the hub it is locked by dropping balls into the groove through a hole in the hub, which is plugged when the groove is full. The nut is now secured but free to turn easily. The flywheel may be slipped onto the shaft and the Woodruff key started in, then by turning the nut the wheel is forced home and locked. By turning the nut in the reverse direction the wheel is started from its seat and



TRUSCOTT MOTOR BOATS AND ENGINES AT THE SPORTSMEN'S SHOW

forced off the shaft. A special type of igniter is used, covered by a hinged case which protects it from all danger of derangement and yet leaves it easily accessible. Motors of 2 and 4 1-2 and 6 horse

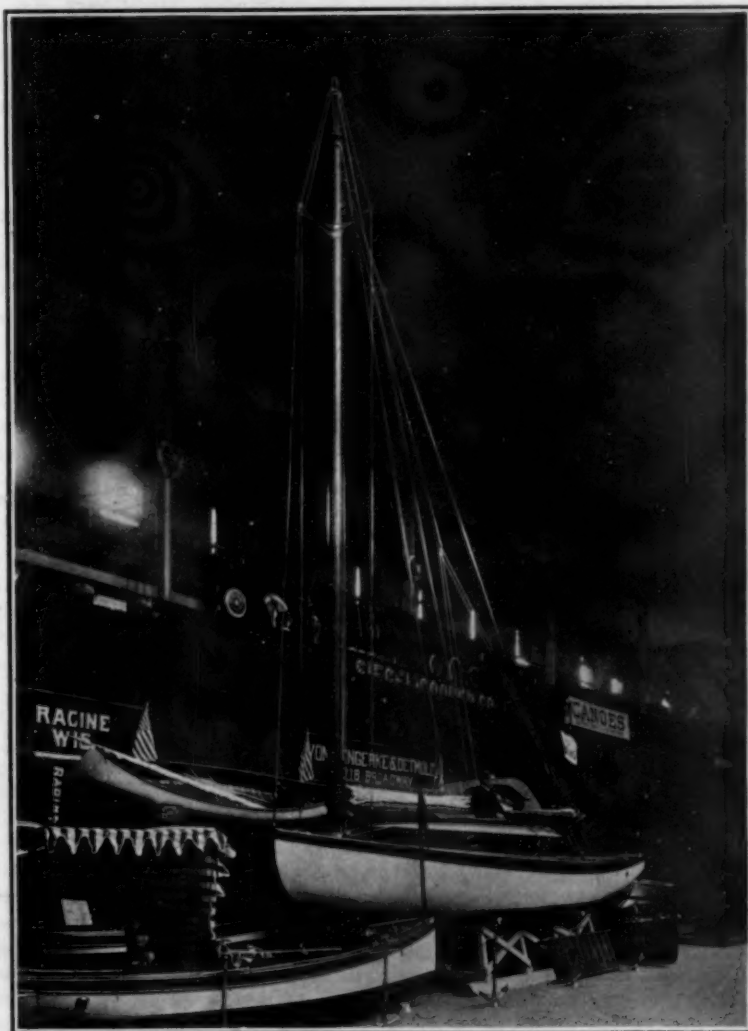
power single-cylinder, are shown, with one of the Union motors, of similar pattern but cheaper in price, of 2 horse power.

MIANUS MOTOR EXHIBIT.

The Mianus Motor Co., of Mianus, Conn., is represented by a 6 horse power motor shown by the Boston agents, the Pneumatic Mattress and Cushion Co. This motor is of the two-cycle type, with single cylinder, water-jacketed throughout. It is fitted with the Gray igniter, described last week in THE AUTOMOBILE. This device has but a single spiral spring and is very effective in action while the adjustment is simple; the eccentric-rod may be disconnected and replaced without altering the adjustment. The throttle, controlled by a small lever, is outside the crank-case. The connecting-rod is fitted with a small oil reservoir just above the main bearing which may be easily filled from a squirt-can through an oil hole in the casing; without stopping the motor to remove the casing. The flywheel of this motor is marked plainly at two points, the contact and the tripping point, so that no difficulty is found in making new adjustments after any parts have been removed and replaced. The words "Contact" and "Trip" are stamped into the face of the flywheel. Another special feature is the water-jacketing of the muffler, the cooling water from the cylinder-jacket passing to the lowest point of the muffler and leaving at the highest point after cooling it to a point which prevents all danger of fire.

STANDARD MARINE ENGINE.

This well-known motor, made by the U. S. Long Distance Automobile Co., remains unchanged from last year with the exception that it has been fitted to use a lower grade of naphtha or the "distillate" common in California. It is now in use in many places where high grade naphtha cannot be obtained and a poorer fuel must be used. Three motors are shown,



RACINE AUXILIARY SAILBOAT, WITH 3 1-2 H.P. MOTOR

the 10, 15 and 20 horse power; two, three and four cylinders respectively.

WESTERN GAS ENGINE CO.

This exhibit includes one of the company's "Recreation" launches, a 21-foot boat, with canopy top, fitted with a 3 1-2 horse power motor. The new model is

multiple oiler, each connecting-rod being provided with a small pocket which wipes a drop of oil from the end of the feed-tube at each revolution, conveying it to the crank-pin bearing. A new reversing gear with bronze spur gears is also used. One of the 25 horse power motors is shown,



TOQUET MAHOGANY SPEED LAUNCH AT GARDEN SHOW

made with cylinder and head in a single casting and is fitted with a new sparker. One of the two-cycle motors of 2 horse power is fitted with its wheel running in a glass tank. One of the new four-cycle motors, two-cylinder, 8 horse power is shown on a stand, with a two-cycle single-cylinder of 1 horse power and a two-cycle, two-cylinder of 12 horse power.

TOQUET LAUNCH & MOTOR CO.

This exhibit was delayed, being shipped by boat and caught in the ice in Norwalk Harbor, so that it was only partly in place on Monday. It includes, in addition to several motors not yet on their stands, a very handsomely built speed launch, of mahogany throughout, with overhanging bow and a stern shaped like the ram of a warship. The dimensions are: length over all, 25 feet; breadth, 5 feet; draft, over

with three smaller motors of 14, 8 and 4 horse power respectively.

KEROSENE MOTOR.

But one kerosene motor is shown, the Raabe compound, built by the M. & R. Engine Company, New York. This motor is similar in general construction to the steeple compound marine engine, the high pressure cylinder being above the low, the two being double-acting, and fitted with crosshead, guides and connecting-rod and also reversing by link and eccentrics. Gasoline, naphtha or other liquid fuels may be used, but it works successfully with kerosene for which it is specially intended. The motor is of 20 horse power and weighs 500 lbs., the flywheel weighing but 75 pounds. The company is also building a simple motor using kerosene.

The Pierce launch is shown by the

Correspondence

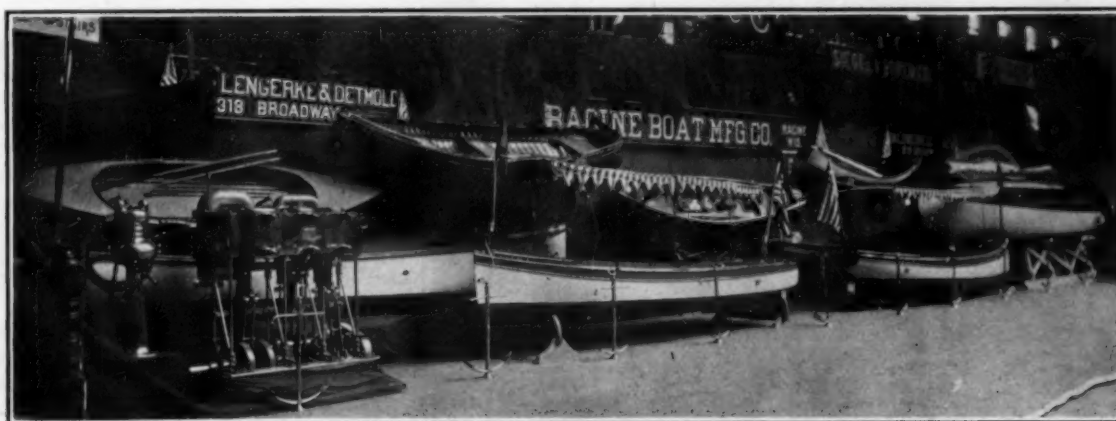
Foreign and Domestic Shows.

Editor THE AUTOMOBILE:

Sir:—Having visited both the Paris and London automobile exhibitions, held in the Grand Palais and the Crystal Palace respectively, and having attended every automobile show in the United States since the first one was inaugurated, a comparison of the exhibitions in the different countries may be interesting.

The Paris show was the largest as well as the most interesting, because more new things were shown there than at the Crystal Palace. Some of the English show men claim that the Crystal Palace is a larger exhibition hall than the Grand Palais, yet on account of the many posts and subdivided rooms the exhibition at the Crystal Palace did not show up to advantage. The Frenchmen place a great deal of value on decorations and beautiful signs. Whether by a thorough understanding among themselves or on account of a rule made by the show management, all of the signs were of the same height, and were beautifully illuminated.

The Grand Palais is very much larger than Madison Square Garden, while the Crystal Palace is probably two and one-half times larger than the New York exhibition room. In my opinion the Grand Palais is the best situated for holding automobile exhibitions, as it is located close to the Champs Elysées, which is the most beautiful avenue in Paris and gives the manufacturer an elegant opportunity to demonstrate to the owner the running qualities of a car. From the Champs Elysées several very broad avenues radi-



RACINE BOAT MFG. CO.'S EXHIBIT AT THE NEW YORK SPORTSMEN'S SHOW

shoe, 2 feet 3 inches. The launch will carry a 5 horse power Toquet motor.

BUFFALO GASOLINE MOTOR EXHIBIT.

The Buffalo motors, all four-cycle and from 2 to 14 horse power, are well known to motor users. The new model has a bevel-gear drive for the time-shaft in place of the chain formerly used and a new mul-

Siegel-Cooper Company, of New York, as a part of its general exhibit of sporting goods. William Roche, of New York, has an interesting exhibit of his electrical appliances for launches and motor cars, including the "Autogas" dry battery and the Roche double-pole spark plug. The show will continue until March 7.

ate. The manufacturers were not slow to take advantage of the excellent situation of the Grand Palais, and had demonstrating cars opposite the show building, ready to take prospective customers anywhere.

LOCATION OF CRYSTAL PALACE.

The Crystal Palace is situated in a suburb of London, on a hill overlooking the

city, and while it must be a beautiful place in summer, it is not the most inviting place to go to in winter. It takes from 35 to 50 minutes on a steam railway, and the fare for the round trip is equivalent to 50 cents. The attendance at the Crystal Palace in comparison to the Grand Palais was probably one-half, but withall, this was a large attendance considering that the Grand Palais had a paid admission of over 300,000. At the Grand Palais there were special days set aside for the extremely wealthy and the poorer classes by making a difference of 4 francs in the admission fee, that is, on certain Wednesdays the admission was 5 francs, while on Sundays it was 1 franc. On one of the Sundays there were nearly 50,000 paid admissions, which shows the interest taken by a class of people who cannot afford to own automobiles, but who wish to learn all about them.

The arrangements of the exhibits, the broad avenues, the artistic signs and the flower gardens, all illuminated with miniature and multicolored lights, at the Grand Palais, were so far in advance of what I saw at the different shows in America that it would pay Manager Sanger of the Madison Square Garden and other managers of automobile exhibitions to send a man to future shows in order to copy at least a few of the many innovations. Although the attendance was at times very large, even for such a large building, the officers kept all the aisles clear.

One thing that spoiled the almost perfect arrangement was the inefficient heating of the building, since the Grand Palais has no steam plant and was dependent for heat on small hard coal and oil stoves placed in the aisles.

PARIS SHOW METHODS.

There were no flowers, no buttons or souvenirs given away in order to draw audiences. The nearest approach to American methods was in giving every holder of a paid admission an envelope containing a number, which was a chance to win one of twenty-eight presents, among them a \$3,000 automobile, a \$1,500 bedroom set, a piano, and twenty-five other prizes. There is no doubt but what a great many people, especially on Sundays, came there several times in order to hold a number of those lottery tickets.

In contrast to the number of demonstrators and poorly informed clerks who try to explain the merits of the cars in America, such men were not seen at either of the foreign shows. In fact it was difficult to do business with the foreigners, as only a few of the owners and manufacturers were at the booths, ready to answer questions. Those who were on hand were more interested in getting information about the improvements incorporated in other cars than to sell their product. This is reasonable to expect under the present conditions, since many of the best known makers are sold up months ahead. In the

case of the Mercedes car, made at the Daimler-Canstatt Works, they are sold up three years ahead and the entire output is taken by C. L. Charley, who, according to current stories, was, less than five years ago, earning about \$6.00 a week working in a garage cleaning vehicles.

The difference between the American and European manufacturers is that too many of our makers bend all their energy in first selling vehicles, then hurrying the manufacture of them in order to get deliveries somewhere near the time the salesman promised, while the European maker first studies how to build the best car, manufactures a few, gives them hard trials and finally looks for a customer.

FRENCH BUILDERS' OUTPUT.

Many of the automobile makers in France who have international fame produce a small number of cars compared to the American makers, and there seems to be no way of hurrying them to duplicate and triplicate their plants, which would be the case with American manufacturers under similar conditions. This, to my mind, is the proper course to take in an industry that has not yet any settled type that would warrant production in large quantities. It is true that some of the light runabout cars can be manufactured in large quantities, but the improvements are so radical and made so frequently that it would be poor business policy to undertake to build a large quantity of higher powered cars. Not that a few makers could not make a success of building a large number of duplicates, but if a number of them would undertake the same thing, the market would be flooded with cars of the same type, which would eventually force the selling price down below the cost of manufacture.

Once more the question of demand and supply comes up. While there is a demand for an unlimited number of pleasure cars, yet every one is anxious to own a car embodying the latest improvements, and where a series of say 3,500 or 5,000 cars is built, it is likely that it would take from one to two years to dispose of them. After one year it would be necessary to sell the car at a reduction, to offset the improvements made within that time by rival manufacturers.

CARS WITH ENCLOSED BODIES.

I notice with a great deal of satisfaction that nearly every maker in Europe is making models with regulation carriage bodies; that is, enclosed body, seating two or four passengers, and with an enclosed glass front to protect the driver. The top of the carriage has a brass railing to hold all kinds of luggage. The additional cost of this style of carriage varies from \$100 to 500, according to the quality and finish of the body. Some of them are upholstered in the finest of leathers, silks and satins. They are lighted by electricity, contain speaking tubes to the driver, and a card and stationery case. There is no limit to

the manner in which the interiors of these cars may be made use of. Between the thick padding and the aluminum body an ice tank could be built in with a movable spout that may be swung out of the way when not in use. Under the seat a chest could be built in for lunch-box, cigars, etc. This is a matter of individual taste and for the body manufacturer to carry out.

It is getting to be more and more the style for the automobile manufacturer to build the complete chassis, and allow the body manufacturer to finish the vehicle according to the individual taste of the owner. This allows the owner to have a car built to suit his requirements and the car may be finished according to his idea of combinations of colors. This also helps the automobile manufacturer, because it gives him more room in which to build the machinery, and it is generally known that it takes from three to five weeks to properly finish a vehicle body, and it takes up twice as much room as the chassis.

INCREASED ROOM FOR PASSENGERS.

The machines are built with a much longer wheel base and with a wider tread—which gives more room for the passengers and does not cramp their limbs in such narrow space. They are also built very low down. The old style tonneau is nearly extinct. In its place is built a very much higher seat and in surrey style, seating three people comfortably. When the door is closed a continuation of the seat is lowered down.

Improvements in the carbureters, mufflers and engines have brought about the present flexibility in the operation of gasoline cars, and have almost eliminated the noise which was so dear to the pioneer and so objectionable to the motophobes.

Very few if any manufacturers in France build all of their parts. Makers of complete vehicles do not boast that they make every part in their own factory. If some one makes an improvement they either hire the man, license from him or allow him to make the part in his own little shop. An inventor in France as a rule is well satisfied if the product of his own hands or that produced with the help of his sons or relatives, is taken by a manufacturer.

I find that most of the parts makers are the workmen themselves, with comparatively small facilities for turning out goods in large quantities. Of course there are exceptions, but comparatively few. If a parts manufacturer promises to deliver goods in a certain time, he must, according to the law, make his delivery or show cause why he was unable to fulfill his promise. He must pay substantial damages to the customer if there has been any negligence on his part or if he made any rash promises. For that reason an American manufacturer placing an order with a French parts maker, does not understand why the latter does not promise to deliver

the goods in less than from five to eight weeks, when he believes that the same thing can be manufactured in America inside of four or five days.

EMIL GROSSMAN.

New York.

Turntable for Motor Barns.

Editor THE AUTOMOBILE:

Sir—The great convenience of a turntable for the automobile stable being now generally recognized, I send you herewith a sectional elevation of one which may suit the requirements of some of your readers.

While it is of great importance to be able to instantly "change ends" with an automobile and avoid lifting or cramping, the turntable is no less desirable when cleaning or repairing. Any part may readily be brought to the best light; washing may be done on the turntable, and no amount of water can affect the working parts, with the construction shown in the sketch.

Either end of the car may be readily

a bearing plate, *G*, which rests upon two timbers bolted under the sills of the carriage house. There is a brake (not shown) which holds the turntable against turning when for any reason it should remain as a stationary part of the floor. The device is entirely noiseless and may be revolved, automobile and all, with a force of a few ounces.

STERLING ELLIOTT.

Newton, Mass.

Cure for Motor Grime.

Editor THE AUTOMOBILE:

Sir:—About the most serious drawback to touring without taking along a mechanic to do the work is the awful state one's hands must always be in, even though there be no breakdowns or serious derangements.

As mineral oil is now generally used, common soap makes no impression upon the grime that seems to sink in deeper the harder you wash. The usual practice is to wash the hands first with gasoline or

smooth and natural it leaves the skin. The same mixture applied to the face protects it from the wind and heat in summer. I carry a good-sized can in the tool box and use it liberally, and no longer am ashamed of my "motor paws."

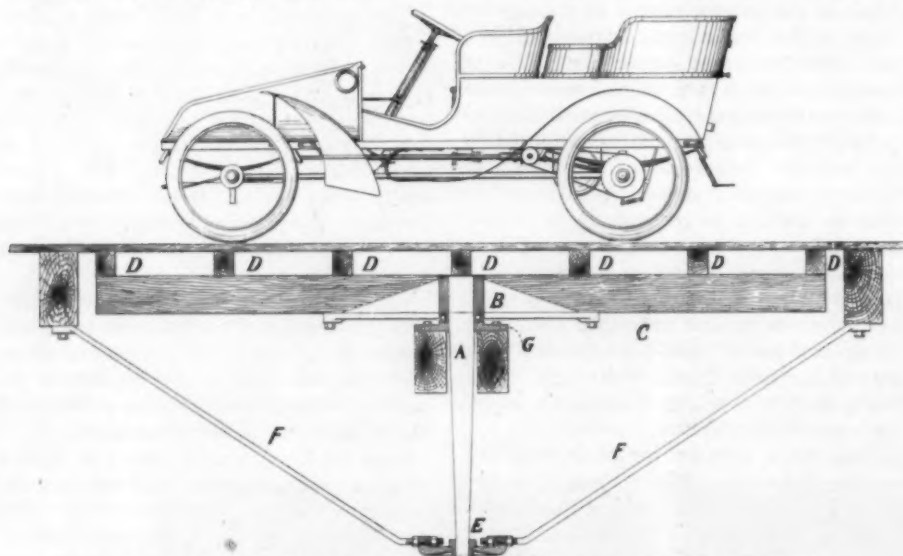
S. W. RUSHMORE.

Jersey City, N. J.

Pope-Robinson Transmission.

Among the transmission gears on cars exhibited at the New York show, especially those which ran in an oil bath though not belonging to the sliding-gear class, that on the Pope-Robinson cars attracted some attention, but could not be fully investigated on account of pending foreign patents. It consists, like the sliding-gears, of two parallel shafts in an oil-tight casing. The upper shaft, it seems, drives direct on the high gear, when a single sliding pinion on the lower shaft is thrown out of action, but when the sliding pinion is in mesh, one or the other of two clutch gears on the lower shaft transmits the power at reduced speed. The sliding pinion is operated by a pedal and in one position releases all connection between the motor shaft and gearing. In this position it permits the reverse to be thrown in by direct transmission from the high speed, but the action of the reverse is greatly moderated by the lubrication of the clutch which controls it, so that no shock is felt when it is applied while going forward. It simply absorbs the momentum of the car as rapidly as possible and as gradually as necessary, like a well regulated brake, and then starts the rearward motion in the same manner, giving the driver plenty of time to throw in a forward gear if rear motion should prove unnecessary. In close street traffic this simplifies the operative movements, while in emergencies the brake or brakes may, of course, be applied to accentuate the retarding action. The clutch gears are operated by a separate lever which, however, is rarely used, and is therefore shorter than the main lever, so as to leave the handle of the latter quite free, obviating mistakes.

At the meeting of the Institution of Mechanical Engineers in London on January 16 a paper of considerable importance on the subject of "Cutting Angles of Tools for Metal Work as Affecting Speed and Feed" was read by H. F. Donaldson, of Woolwich Arsenal. The author strongly favors the grinding of all tools to definite and known angles, according to the service expected of each, and the running of lathes, planers and similar tools at fixed speeds proportioned to the nature of the metal operated upon. This involves the grinding of all tools by machine in the tool room instead of by each individual workman, and also the marking of the speed on each driving cone of machine tools.



TURNTABLE FOR MOTOR BARN DESIGNED BY STERLING ELLIOTT.

pointed in either direction to run it over a pit or into any part of the building. It is extremely useful for clubs, factories, repair shops and automobile stations. In fact, no well regulated family should be without it.

In the accompanying sketch *A* is a tapered steel shaft which has a heavy, four arm, iron spider, *B*, rigidly secured to its upper end. Across the extended arms of the spider are two timbers, only one of which *C* is shown in this view. Across these main timbers are fastened seven cross beams, *D*, upon which the floor is laid. The lower end of shaft *A* turns in an adjustable bearing, *E*, which is held in place by four heavy braces, *F*. These braces are bolted to the stationary timbers which surround the turntable. The entire weight is carried by eighteen large steel balls, which are placed between the hub of spider, *B*, and

with some powerful washing powder, which destroy the oil in the skin and make it harsh and raw.

I have hit upon the plan of first rubbing the hands well with a soft cold cream, which seems to enter the pores and replace the dirt, so that with a little soap the hands may be washed as clean and as readily as though they had never been in the grime.

The cold cream of the corner drug store is too stiff and waxy, and that which I use is of the consistency of soft butter and has the following ingredients: 4 ounces imported sweet almond oil, 1 ounce rose water, 1 ounce extract witch hazel, 1-2 ounce white wax, 3 drams spermaceti, 2 drams benzoin.

All of the ingredients are slowly melted together and then the benzoin is added and the mixture is well stirred together.

It is surprising how this compound will bring the dirt to the surface and how

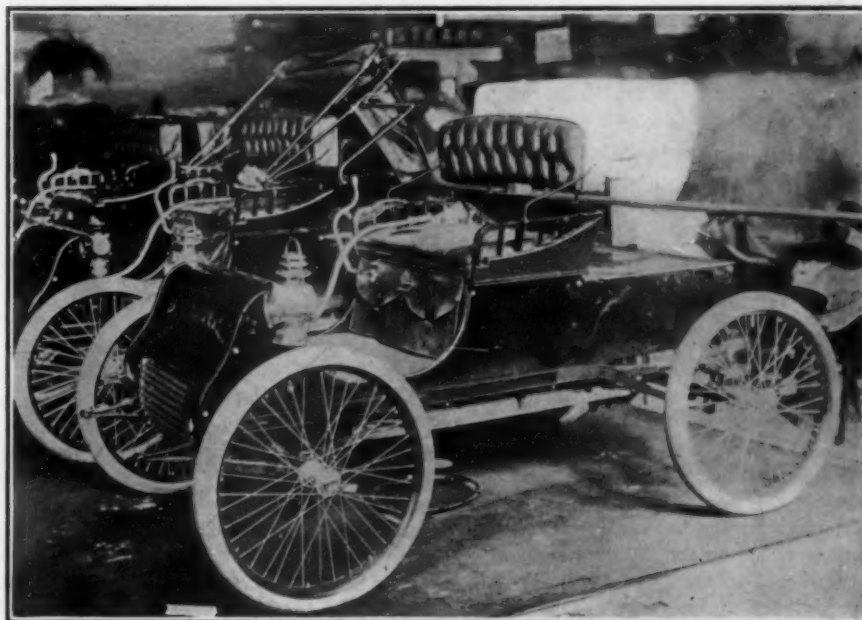
Novelties and Sundries at Chicago Show.

Among the novelties at the recent Chicago show were the friction-drive machines, which attracted the attention not only of the local visitors and enthusiasts, but of those from the East, for this type of car had not been displayed at the Garden show in New York. The principles of this form of transmission were discussed at length in our issue of February 7, and we have already published photographs of the cars, which are now described in detail.

MARBLE-SWIFT DOUBLE DRIVE.

The transmission mechanism of the tonneau car shown by the Marble-Swift Automobile Company, of Chicago, is a reversal of the usual construction of friction drive. It has two metal friction discs mounted on the ends of an interrupted counter-shaft from which the drive is by chain to the rear wheels. Between these discs is mounted a longitudinal shaft directly connected to and turned by the motor shaft and carrying two friction wheels mounted slidably upon it, so that they can be moved toward and from each other across the faces of the friction discs. As the power is communicated from them to the discs, the nearer they are to the centers of the discs the faster the vehicle travels. For reverse the friction wheel shaft is shifted, to cause the driving friction wheels to contact with the opposite

having mechanically operated valves, Longuemare carbureter and lubricated by the splash system. A pump, chain-driven



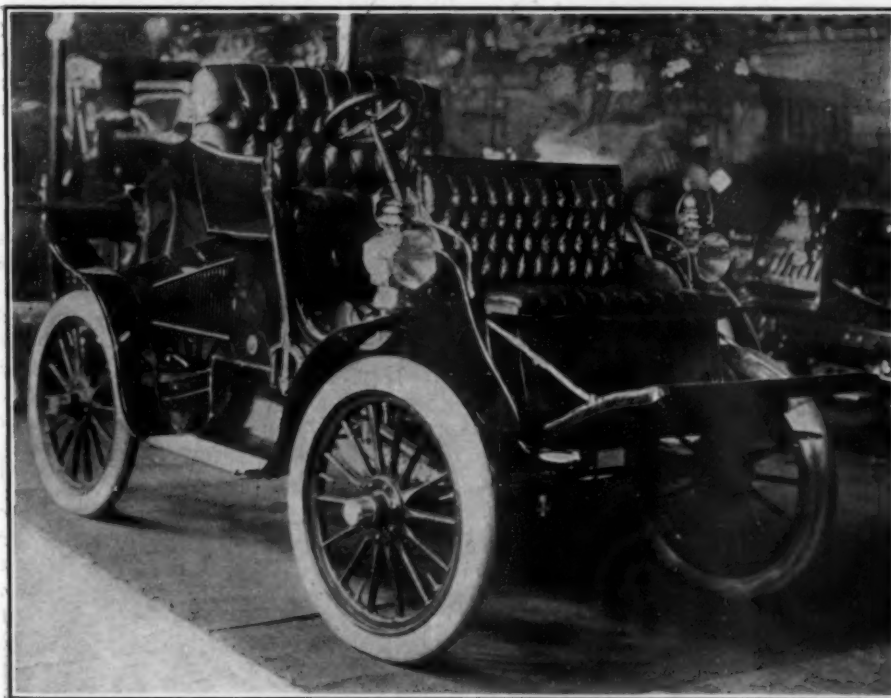
STAND OF THE GLIDEMOBILE, SHOWING CAR WITH AND WITHOUT CANOPY,

from the shaft at the back of the motor, forces circulation through a radiator of new construction, consisting of a series of

the seat. The car is enameled a dark maroon or chocolate color.

THE UNION RUNABOUT.

Another newcomer into the ranks of the friction-drive advocates is the Union Automobile Company, of Union City, Ind.,



SHELBY 10 H.P. CAR WITH FOLDING FRONT SEAT AT THE CHICAGO SHOW.

driven discs on the opposite sides of their centers.

The car itself is of tonneau type, with detachable rear seat portion and Mercedes pattern hood. It is driven by an 18 horse power vertical motor at the front

vertical, hollow copper slats about three inches wide with air spaces between. This and the water jacket of the engine contain about three gallons of water, which is all that is carried. A gasoline tank of eight gallons' capacity is formed at the back of

which company, although it has been building vehicles of this type for more than a year, made its first display at a show at the recent Cleveland affair, following it by displaying at Chicago. In its machine the motor, which is of double-cylinder opposed type, is set inside the body, transversely, at the extreme back, with the flywheel facing forward. A fiber-faced friction wheel, standing at right angles to the face of the flywheel, is mounted slidably on a transverse shaft beneath the seat of the car, and drives by sprocket and short perpendicular chain to a jack-shaft bracketed to the frame of the car on the right side. This shaft carries two sprockets, the drive to the differential on the rear axle being from the smaller one, by a horizontal chain. The friction wheel is kept moist with oil, and is moved laterally for speed change and reverse by means of a crank mounted in a vertical steering column in front of the seat. The engine is started by means of a heel button on the footboard, operating a pawl and ratchet on the crank-shaft. A hand crank is also provided for use in case of any difficulty in starting.

The engine has a number of features worthy of mention. The cylinders are of 6-inch bore by 4-inch stroke, giving from 8 to 10 horse power at 600 to 800 revolutions, and having a variation of from 350 to 1,500 revolutions per minute. It has rotary admission valves operated by a reciprocating rod actuated by an eccentric on the end of the crank-shaft. The exhaust valves are mechanically operated by

cams on the shaft. The valves are reversed, the retracting springs being on the outside. The quantity of mixture admitted to the cylinders is regulated by opening or closing the ports in the rotary valve. The charge is exploded by magnets partly in the explosion chamber and partly in the cylinder. The cooling water is forced by a pump through the radiator. The motor bearings are phosphor-bronze and brass.

The motion of the car is stopped in ordinary cases by shifting the friction wheel across the center of the flywheel, but an emergency brake is provided on the differential. Tension of the friction wheel is regulated by pedal with a ratchet.

FOUR FRIEDMAN ROAD WAGONS.

The Friedman Automobile Company was a prominent expositor of the friction drive, having a large space in the main exhibition hall, where four Friedman runabouts and a Friedman two-cylinder opposed motor were shown, the motor having portions of the cylinders cut away and being driven by a small electric motor to show the cycle of operations. One or more of the motors in the vehicles was also kept running a large part of the time. These attractive little cars are so well known that detailed description is superfluous. Suffice to state that the motor is placed transversely in the back of the body, with the flywheel facing forward where a sliding friction wheel on a transverse shaft meets it at right angles and can be moved from side to side across its center. Control is extremely simple and the little roadsters are very light and easily handled.

Novelties in Sundries.

Sundries makers were fairly well represented at the show, the leading makes of tires, storage and primary batteries, motors, lamps, gears, lubricators, boilers, horns and innumerable other parts and fittings being exhibited either direct by the manufacturers or by western selling agents. Most of these displays were located beneath the balconies and in the annex against the side walls.

NEW RUTENBER MOTOR.

A new four-cylinder vertical motor, with mechanically operated inlet and exhaust valves placed on opposite sides of the cylinder heads was shown by the Rutenber Motor Company, in the stand of P. J. Dasey & Co. The cylinders are cast separately and bolted to the crank case, so that any one of them can be removed without disturbing the others. The valve operating worm gears and the cam shafts are enclosed in the crank case where they are lubricated with the other parts by the splash system. The sparking plugs are located at the tops of the explosion chamber just above the intake valves, while pet cocks are placed on the opposite side over the exhaust valves. With cast iron crank case this motor weighs 500 pounds crated, and with aluminum case 375 pounds. The

cylinders are machined to 3 1-2-inch bore and 4-inch stroke, and are rated at 3 1-2 horse power per cylinder at 900 revolutions. The motor is fitted with a Kingston float-feed carbureter. It is made in sizes up to 80 horse power, while in two cylinders it is furnished up to 40 horse power.

SIMPLEX AUTOMOBILE JACK.

In addition to the full line of Solar acetylene automobile and bicycle lamps, the Badger Brass Company exhibited a couple of brass models of a powerful jack that is a copy of the popular Princess jack in France. This has a sliding rack carrying at its head a yoke or step for the axle and meshing with a pinion in the body of the jack. This pinion is made integral with a short shaft that rests in slots in the sides of the jack and at one end has a gear that is engaged by a worm. This worm has a square key hole to be turned by a long key rod with a double handle like a tire foot-pump. The movement is slow, but exceedingly powerful, the capacity of the jack being 1 1-2 tons. It is also simple and strong. The slow action is no drawback, for the slotted journals of the gear shaft allow the worm gear to be disengaged by simply turning the jack upside down or by lifting the rack by hand until the yoke meets the axle, when the key can be brought into use for raising the load. The company expects to be ready to make deliveries of these by the middle of March.

WESTERFIELD OPPOSED CYLINDER MOTOR.

The Westerfield Motor Company, of Anderson, Ind., showed a two-cylinder opposed motor, with cylinders 5 inches by 6 inches, developing 15 horse power at 800 revolutions. The cylinders are cast separate from the crank case, and the water jackets separate from the cylinders. The intake and exhaust valves are set on without screws, the former being located in metal elbows that are simply socketed into pipes on the cylinders, and are held in place by yokes and set screws. The cam on the time shaft has a raised portion which can be shifted to hold the exhaust valve open to relieve compression when starting the motor. The pistons are balanced, moving toward and from each other, and are connected to throws on the shaft, one by a single straight connecting rod and the other by two rods between which the opposite rod reciprocates. The cover of the crank case is circular and locks in place by a bar and center thumb-screw. The sparking is automatically regulated by a governor on the crank-shaft. The two-to-one shaft is inside of the crank case, where it is turned by spiral gears. With cast iron case the motor weighs 305 pounds, and with aluminum case 260 pounds.

COMPOUND FOR BRAZING CAST IRON.

The American Brazing Company, of Cincinnati, demonstrated a product called

Ferrofix for brazing cast iron or steel, as in repairing flywheels, cylinders or smaller cast metal parts. The compound consists of oxides of iron and copper in powdered form, which is mixed with a liquid and used for painting the ends of the metal to be united. This reverses the usual practice of cleaning the metal of oxides before brazing, the object in this case being to produce an amalgamation of copper and cast iron that will cause the metals to cohere. The cast iron is heated only to a comparatively low temperature—cherry red—and a flux of borax mixed with some other chemical is applied before the spelter is put on. Tests of the bars of cast iron united in a Turner brazer at the show showed that the metal will break in a new place instead of where brazed. The American Brazing Company has taken out a patent on the invention and purposes to sell shop rights to its use, as well as to supply shops with the compound.

BARTON FLASH BOILER.

A water-tube flash boiler built up in transverse coils each united to the next below by a union at the side of the series was demonstrated in the annex by the Barton Boiler Co., of Chicago, which brought it out only recently and was exhibiting at a show for the first time. The coils of pipe are wound spirally with an extra turn bent back and forth across the middle to act as spacer between the coils. From fourteen to sixteen of these coils are placed upon another, connected with unions and held in place by a central rod and cross bars at the top and bottom of the series. Water is admitted at the top and the superheated steam is withdrawn to the engine at the bottom. The coils are interchangeable. Simplicity of construction may be said to be the leading characteristic of the Barton boiler. No thermostat and no water glass are required. The company conducted tests each day of the show, having one of its boilers set up and equipped with a Studebaker-Burnell kerosene vaporizer and burner, to furnish steam for an upright stationary engine provided with a brake on the flywheel which was repeatedly applied to demonstrate how steadily the boiler steamed under load.

IMPERIAL WOOD WHEELS.

This show marked the entry into the automobile line of the Imperial Wheel Co., of Flint, Mich., one of the largest carriage building concerns in the country. It had an unpainted artillery wood wheel mounted on a stand and axle, and showed spokes and metal hubs.

DIXON GRAPHITE LUBRICANTS.

One of the most artistically arranged of the sundries booths was that of the Jos. Dixon Crucible Co., which had a canopied den with Flemish background illuminated with standard glass windows at the back, and hung with an Oriental twisted iron lamp at the center. A rich red and

green cloth covered the table and a red and green rug covered the floor. On a shelf across the back of the booth stood cans of flake graphite, while on the counter at the front were other Dixon products in graphite, including automobile chain lubricant, put up in the form of bricks to be put in a tray with the chain and melted in an oven, so as to soak into all the bearings.

FAGEOL GASPIPE BURNER.

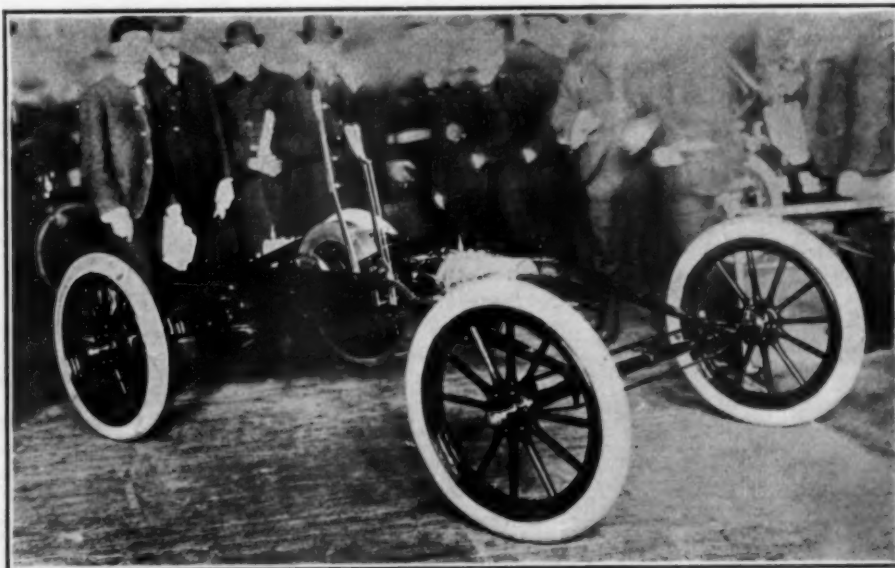
The new Fageol burner, made in Des Moines, was shown for the first time in the stand of P. J. Dasey & Co. This is simply and cheaply constructed from stack iron pressed into pie plate shape and faced together, the meeting edges being rolled over to form a seam. The flues are made from gas pipe, which expands and contracts in the same degree as the stack iron, so that there is no danger of loosening or cracking. The sections of gas pipe are turned with shoulders at their ends for the dished plates to set against, and the ends are then spun down over the holes in the plates. Twelve gas ports are drilled around the flue holes, at a distance of about one-eighth inch from the opening, so that there is little danger of back draft through the burner. This burner is not injured by overheating nor by sudden cooling, to demonstrate which the representative of the company after heating them as hot as possible would plunge them into cold water. The Fageol Burner Co. is bringing out a new kerosene vaporizer to be used with this burner, which will be on the market soon.

BANN-AUTO WOOD WHEELS.

The Muncie Wheel & Jobbing Co., of Muncie, Ind., showed complete wheels and parts of a new style of wood artillery

feature of these wheels is that, in addition to the series of bolts near the outer edge of the flanges that key the spokes

the side of the frame. The pinions, of which there are usually six, are but two-thirds the usual length of spur gear pin-



CHASSIS OF THE NEW TWO-CYLINDER OLDSMOBILE IN CHICAGO.

into place, there is a second series of bolts close to the inner ends of the spokes, making a stiff construction well adapted for use as driving wheels, with the spokes clamped all the way down to the ends, where they are keyed with wood tenons. Other products of this concern are front and rear axles complete with wheels and gears.

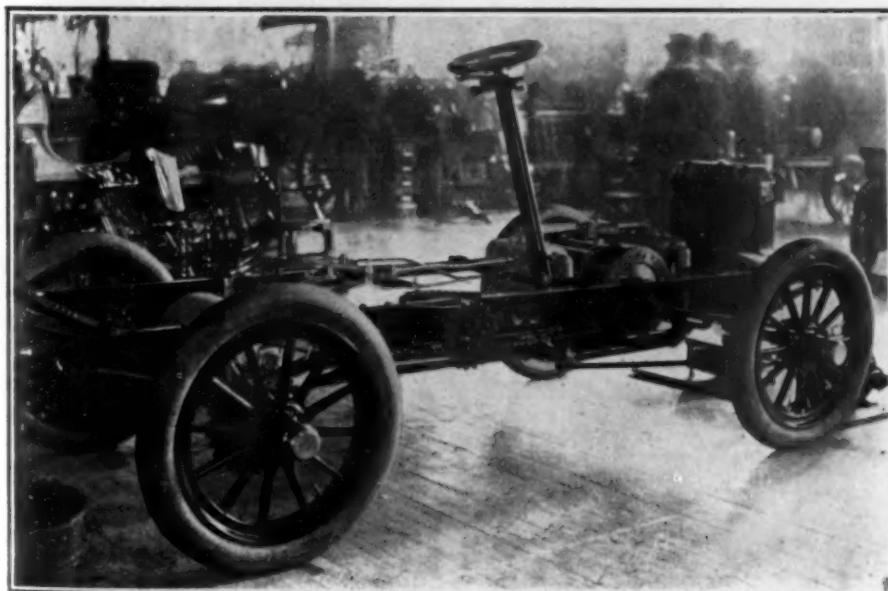
WARNER DIFFERENTIAL GEARS.

A new spur differential gear was shown by the newly organized Warner Differential Gear Co., of Muncie, Ind. The distinctive feature of this is that the large

ions, and are made without hubs and run on bearing bolts that screw into the frame of the differential. These bolts have heads larger in diameter than the pinions and act as bearings for the outer ends of the bolts. Any or all of the pinions can be removed for inspection or replacement while the gear is in place on the axle, and the pinions can be reversed to wear on the other side, prolonging their life two fold. The sprocket rim is detachable without disturbing the rest of the mechanism, and the rims are interchangeable in all sizes. The rims also fit on either side, or two of different sizes can be attached to the gear of different sides; or a sprocket rim and bevel gear can be fitted.

Negotiate for Private Road.

New Jersey automobilists residents in Newark, Montclair, Bloomfield and adjoining towns are planning the purchase of the Belleville turnpike which crosses the Meadows between Jersey City and Kearny for an automobile driveway. As the turnpike is owned by Hudson County, the automobilists will first endeavor to secure it as private property, and failing in that, will open negotiations with the Freeholders and the New Jersey State Road Commissioner. A definite proposition will probably be presented to the Freeholders at their meeting, March 5.



"STANDARD" CHASSIS WITH 4-CYLINDER 25 H.P. HORIZONTAL GASOLINE ENGINE.

wheel that it expects to be ready to make deliveries on in large lots to jobbers in from two to three months. The particular

gears are held in line by central bearings integral with the frame and are held in place by retainers that fit into recesses in

A motorcycle club is proposed in Paris for the convenience of owners of motor bicycles, tricycles and quadricycles, the plan including a free garage with an expert motor mechanic at the disposal of all members and club rooms to serve as a starting place for excursions and a gathering place for exchange of opinions.

NEW VEHICLES

Chainless Crestmobile.

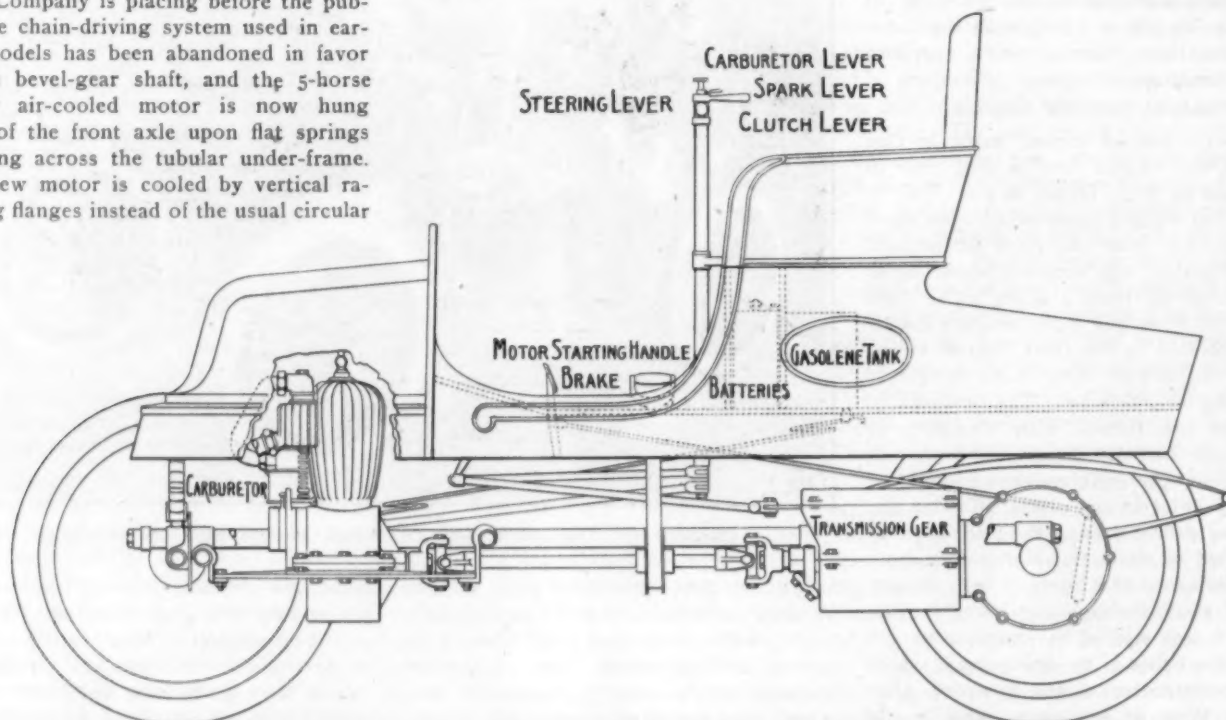
In the new Model D, which the Crest Mfg. Company is placing before the public, the chain-driving system used in earlier models has been abandoned in favor of the bevel-gear shaft, and the 5-horse power air-cooled motor is now hung back of the front axle upon flat springs reaching across the tubular under-frame. The new motor is cooled by vertical radiating flanges instead of the usual circular

ing a rigid support for all parts of the bevel gear drive.

The steering post is placed at the right of the body, the steering lever being amply powerful and delicate to give easy steering under all conditions.

holds it in place when pressure is removed. The brake pedal is easily released by a slight pressure of the foot upon its upper edge.

The body is long and the seat of ample depth and width. A brass trimmed bonnet



OUTLINE DRAWING OF THE NEW "MODEL D" CRESTMOBILE WITH SHAFT DRIVE.

horizontal ribs and develops 1-horse power for each 160 pounds of vehicle weight, the entire carriage weighing 800 pounds.

The bevel-gear shaft has the customary two universal joints and is actuated directly from a high speed friction clutch which locks the second speed and the reverse when it is applied. This clutch as well as the band clutches which actuate the low speed and the reverse by a system of spur gears, works in an oil bath.

The transmission gear is hung on the tubes of the under-frame and all adjustments of it are made from the outside of the casing. All driving mechanism is thus separate from the vehicle body and the space of the latter is left free for carrying the passenger seat and baggage. As in other Crestmobiles the motor is started from the seat by means of a strap and drum equipped with a spring which automatically rewinds the strap after each operation.

The brake is encased in the differential gear housing and acts upon the differential drum, having a strong positive action for both forward and reverse motion, and a self-adjusting device for reducing and taking up wear.

The large bevel driving gear is provided with a long bearing having a positive thrust collar. A plate having a similar bearing is attached to the opposite side of the differential drum, thus insur-

Above the steering lever are placed the carburetor control and the spark control lever. Below the steering lever is the lever which controls the high and low speed. The reverse is controlled by a

covers the motor. A detachable tonneau is furnished with the vehicle, and, when this is not in use, the space to the rear of the seat is entirely available for luggage. Beneath the seat are the gasoline tank,



PHOTOGRAPH OF NEW CRESTMOBILE "MODEL D" WITH HOOD IN FRONT

heel pedal and is immediately released when the pressure is removed.

The brake is actuated by a foot pedal provided with a ratchet and pawl which

holding 6 gallons, the battery and the induction coil. The battery and coil are placed across the front of the space below the seat.

Flexibility of the frame is obtained by pivoting the reaches at the middle of the front axle. An oil pump enables the driver to lubricate the motor from the seat.

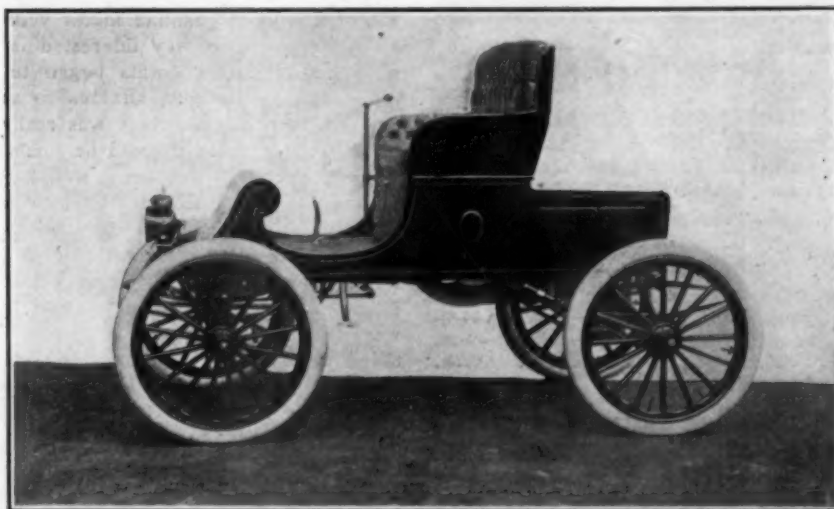
The standard color is dark carmine, trimmed in black. At normal high motor speed the high gear clutch produces 25 miles per hour, and the low gear 7 miles. The wheel base is 72 inches and the track width 46 inches. Wheels are of Midgley steel artillery pattern, 28 inches in diameter, with 2 1-2 inch detachable Diamond tires.

The Loomis Bluebird.

After experimenting continually for a number of years the Loomis Automobile Company, of Westfield, Mass., whose carbureter is well known in the industry, has finished a new model of complete gasoline automobile to be known as the Bluebird, the name being derived from the azure blue color of the body. This is set off with stripes in gold, white and darker blue, and the upholstery is in natural leather. The chassis is in blue and white effect, too, and the hood, seats, dashboard and steps are trimmed with polished brass. The tonneau is detachable and has a child's seat on the door. By its detachment a flat space is left for baggage. The two-cylinder motor has 32 square inches of piston area and is cooled by forced water circulation. The transmission gear includes three forward speeds and the reverse, all in oil, and of meshing pairs one is of steel controlled with one lever. The gears run and the other of composition metal. The

"can be picked up without passing through the others, and any one gear can be picked up instantly without having to set a clutch

pump fail. The carbureter is of the Loomis type, containing air damper and throttle, correcting the gasoline feed in



SIDE VIEW FREDONIA GASOLINE RUNABOUT.

afterwards, as the picking-up act in itself sets the clutch. When throwing out the gear it is impossible to throw it in another gear, as it automatically locks." The car will run for many hundred miles without re-oiling, and the whole top is instantly detachable, without the use of screws, so the whole can be easily examined.

The motor is upright in front and drives by a bevel gear and chain. The control of the motor is by throttle and spark, and the spark is obtained without the use of buzzers or vibrators of any kind. The cooling

such manner that the mixture is automatically preserved constant at all different changes of the throttle and different speeds. The car has three brakes.

Fredonia Runabout.

The new Fredonia car, here illustrated, represents the latest development of the light road car, every detail being of standard make. The wheel-base is 72 inches, the weight is 1,300 pounds, the speed ranges from four to thirty miles, the body is finished in black, with gold-leaf stripe, and the gear is in carmine, with black and gold stripe.

The motor has a single cylinder, 5 1-2 by 6 1-2 inches, cast in one piece, with solid head. The flywheel is 22 inches in diameter and weighs 160 pounds. The frame is of 3-inch channel steel, carried on 1 3-8 by 30 inches oil-tempered springs; the front axle is 1 1-4 inches in diameter, with Timken roller bearings; the rear axle is solid, 1 1-2 inches diameter, with standard roller bearings. The wheels are of wood, Sarvent pattern, made by Phineas Jones, and of 32 inches diameter, with 3-inch Goodrich clincher tires. The Upton special transmission gear is used, in oil-tight aluminum case; the differential is of the Brown-Lipe make, with 1 1-4 by 1-2-inch Diamond chain. Lubrication is provided by one oil and three grease cups, each bearing having a special grease pocket. The tanks are of coppered steel, a Lobee pump is fitted, with copper fin radiator 16 by 28 inches. The Dow combination batteries are fitted for jump spark ignition. A double-acting brake is fitted on the rear axle, also one on the transmission gear. Side lever steering is employed.

Fredonia Mfg. Co. of Youngstown, Ohio, the makers, earned a gold medal in the New York-Boston contest.



LOOMIS "BLUEBIRD" AUTOMOBILE MADE AT WESTFIELD, MASS.

gears are actuated through internal expansion clutches.

"Any one gear," explains the maker,

water tank is carried above the level of the engine, so as to give the advantage of natural circulation, should the circulating

THE AUTOMOBILE

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SATURDAY, MARCH 7, 1903.

THE SOOTED PLUG DISARMED.

Nothing in the way of ingenious improvements of the automobile, exhibited at the French, the British or the American shows with blast of trumpets, has caused so much genuine excitement as a little accidental discovery relating to foul spark plugs, which was modestly announced among the minor incidents in the automobile workshops about New Year's time.

The fact stated was simply this, that a spark plug which was fouled by a short-circuiting deposit of carbon on the porcelain insulator and refused to produce a spark which would ignite the explosive charge in a gasoline motor, would function with perfect regularity when the wire carrying the secondary, high-tension current between the induction coil and the binding post was interrupted by an air gap of not exceeding two millimeters.

The statement immediately attracted attention in all countries where automobiles are made and used. Owners and manufacturers made the experiment for themselves, and found that the statement was correct. The fouled spark plug actually seemed to have lost its terrors through the very simple expedient of breaking the secondary wire and holding the broken ends slightly apart, so as to create a short spark outside of the cylinder, in addition to the spark wanted inside of the cylinder.

Stunned by the simplicity of the discovery which apparently removed the most serious objection to jump-spark ignition and one of the most disturbing factors in the operation of gasoline motor vehicles, all persons in any way interested in ignition and ignition outfits began to inquire into the subject, anxious to make sure whether the discovery was really to be trusted, whether it could be scientifically explained and whether it would affect the use and sale of electrical ignition merchandise. Perhaps the trembler would become unnecessary! Perhaps storage batteries, dynamos and magnetos would be discarded, since it was shown that there was no virtue in a strong current, but that a weak one from an almost exhausted primary battery would create a good spark, just so the new, mysterious outside gap was maintained.

Considerable commercial interests seemed to be at stake, for good or bad, and it seemed within reason to assume that the sale of automobiles to the public at large would be greatly stimulated, now that it might be possible to guarantee an unfailing spark and thereby practical extinction of the most prolific cause of road troubles.

Letters poured in upon the automobile press from inquiring experimenters, and answers from university professors and noted electricians, until a literature has become accumulated on the subject during these two months which places it beyond all doubt that the phenomenon, as observed by workmen in the Panhard factory, was genuine and not surrounded with special conditions destroying its general importance, and also that Science fully recognizes this phenomenon as one previously observed under analogous conditions, in connection, for example, with Crooke's tubes, Hertzian waves and X-rays. Science and the foremost electrical engineers, indeed, take the attitude that the discovery is an old one, and that it is greatly to the discredit of the automobile industry that the principle has not long ago been applied in practice, all of which shows a good deal of human weakness and egotism on the part of the scientists, inasmuch as many of them have driven automobiles for years and have had as much trouble with sooted plugs as ordinary laymen.

While the scientific explanation of the facts, as observed, is of sufficient interest to compensate for its tardiness, it is truly instructive only to those thoroughly conversant with the principles of electric transmission of energy and the great difference existing in this respect between direct currents of low voltage and alternating currents of high voltage. Leaving the discussion of this phase of the discovery to those whose life work is identified with such matters, automobilists may yet accept the facts established without the aid of scientific thought—in this instance after-

thought. The industry is already doing so, for several manufacturers in France, England and here, have taken immediate advantage of the discovery in supplying an adjustable gap on the secondary ignition wire on their machines for the benefit of their customers. What is more, they are improving the opportunity by making this outside spark gap supply an outward and visible indication of the inner workings in the motor, on the principle that if the external spark is observed one may feel sure that the spark in the cylinder is also in order, and that ignition trouble, if such trouble appears, must be due to lubrication or to the quality of the gas mixture. To this end the interrupted wire is placed in a sort of gauge glass on the dashboard plainly within sight. This arrangement had, in fact, been previously perfected by one or two foreign manufacturers without any idea of aiding ignition but solely for the comfort it afforded the driver by enabling him to locate the source of trouble.

In the evolution of automobiles toward ultimate perfection no more peculiar incident than this accidental re-discovery of a known fact has been recorded, and it is a matter for congratulation that it may contribute materially to render automobiles more practical to that large class who are not in a position to take a university course in electricity before purchasing an automobile and are opposed to tinkering at the roadside with apparatus of which they know but little.

So far as may be seen now, the only sufferers should be professional chauffeurs and those repairmen, who are bound to demolish a motor, or at least regrind a valve, whenever some slight irregularity is brought to their attention.

GORDON-BENNETT RACES.

Through the many difficulties in finding a suitable course for the International cup race and the special preparations of manufacturers and contestants for the event, enormous and widespread interest is being worked up in this tournament between the industries of the four greatest manufacturing nations.

A ten-shilling subscription has been opened among British automobilists to defray the expenses of improving the race route in Ireland. The automobile journals receive contributions. One of them says that a handsome subscription list will show that English automobilists are really the sportsmen they are believed to be and "not disposed to take advantage of any benefit that might accrue to the stronger English vehicles by running the race on indifferent roads." A curious appeal, unless the readers are supposed to doubt the implied claim for the superior strength of English automobiles. The magnanimity of waiving a perfectly legitimate advantage would be almost incredible were not the rules for European races being whit-

tled down at present to an extremely fine point of systematic impartiality. The British Club leads in this respect. It has, for example, writes the *Automotor Journal*, taken forcible steps to prevent intending competitors for the Gordon-Bennett race running over the proposed course at high speed before the race, and Sir David Salomons, chairman of the foreign relations committee, has addressed a letter to the president of the sporting commission of the Automobile Club of France, pointing out the necessity of prohibiting any such proceedings. "Of course, intending competitors will not be debarred from surveying the course at the legal speed, but it is quite unfair for any of them to endeavor to gain advantage by practising at full speed on the actual course. * * *

"It would be simply nothing short of wicked to attempt anything of the kind on Irish country roads. The small local traffic, particularly that of two-wheeled pony and donkey carts, is much greater in Ireland than in England, especially on market days, and in addition horses, mules and donkeys are systematically turned out to browse on the roadside, and accidents would be almost certain. A few accidents would have a very deleterious effect on the attitude of the country people, which is now all that can be desired. The prohibition is absolutely necessary, and must be rigidly observed. Of course on the day of the race, when everyone has adequate notice, matters will be quite different."

The new Mercedes racing machine is said to have the motor midway between the two axles and now *La Locomotion* accuses Alexander Winton, of Cleveland, of slavishly imitating the Mercedes people in this respect. For once the editor of the most correct French automobile journal has got badly mixed in his dates.

French progress does not seem to have been retarded by the close affiliation between automobile and bicycle manufacturers, but then there never was a bicycle boom in France, and therefore also no collapse.

Application for the charter for the new Pittsburg, Pa., Automobile Club has been made and a permanent organization has been effected. The officers and incorporators are: President, George H. Flinn; first vice-president, James Francis Burke; second vice-president, W. C. Temple; third vice-president, D. H. Hostetter; treasurer, Reuben Miller; secretary, Thomas R. Hartley, and Reade W. Bailey, W. L. Elkins, J. A. Hawkins, J. A. Hawkins, A. R. Neeb, H. W. Uring, George Hailman, E. M. Byers, W. Linford Smith, B. W. Lewis, Robert Pitcairn, Jr., H. P. Maxim, W. R. Hilliard and Dr. R. J. Eaton.

The new motor boat association outlined at the preliminary meeting on January 20 was formally organized under the name of the American Power Boat Association at a meeting held at the house of the Columbia Yacht Club, of New York, on February 25. Representatives were present from the various yacht clubs about New York, the Sound and the Hudson River. The special committee on constitution and by-laws presented drafts of these articles, which were adopted. The organization is open to all yacht clubs of America having a regular membership of fifty, and each club is allowed one representative for the first one hundred or less of membership, and one for each successive hundred, except that no club is allowed more than five in all. The annual dues are \$3.00 for each club, the annual meeting will be held in New York in February of each year, and a general meeting will be held each October. The officers for the coming year, with an Executive Committee, will be elected at a meeting to be held on March 18.

The committee on measurement rule presented a report embodying a proposed measurement formula and list of classes, with allowance tables, these being prepared by H. J. Gielow. The rating, which will be used both for classification and allowance, is found by multiplying together the square root of the load waterline and the horse power and dividing the product by the area of the midship section; the cube root of the quantity thus obtained being multiplied by 15.

HORSE POWER FORMULA.

The horse power is obtained as follows: Steam, to be calculated by the standard formula for indicated horse power. Electricity, to be calculated at the rate of 950 watts to equal one horse power. Gasoline explosive engines, to be calculated by multiplying the area of one piston in square inches by the number of cylinders, this in turn multiplied by the stroke in feet and the revolutions per minute, and the product divided by a constant. The constant for four-cycle motors is 1,000, and that for two-cycle is 600. The revolutions are to be taken from the maker's or owner's certificate, subject to verification by the association measurer.

Launches will be divided into two main classes, cabin and open, the latter including also the type known as "hunting launch," with large open cockpit and small cabin. The three powers, steam,

Tests of the Hydroleum burner, which permits the use of Texas oil at 4 cents per gallon instead of gasoline at 25 cents (British prices), have demonstrated that the burner is most practical in the large sizes adapted for heavy steam trucks. The

electricity and vapor, will also be classed separately.

CLASSES OF BOATS.

The classes are as follows:

Cabin Open

A	H	Over 50 feet, rating by rule.
B	I	50 feet and under.
C	J	40 feet and under.
D	K	32 feet and under.
E	L	26 feet and under.
F	M	21 feet and under.
G	N	17 feet and under.

This work of the new Association is closely analogous to that of the newly organized Marine Motor Association of Great Britain at a meeting on February 4, when the following rules were adopted:

ENGLISH MEASUREMENT RULES.

The measurement of launches and other motor boats for racing purposes shall be obtained by means of the following formula: Rating = $\frac{L \times P}{A}$, L being over all length, P the power of the motor and A the area of midship section (immersed). The area of midship section to be taken at the point of greatest breadth on deck, and to be measured by means of a half mould fitted to the outside of the boat, the waterline at that point being afterwards marked on the mould.

POWER OF THE MOTOR.

The power of the motor (M P) to be ascertained by the following rules. Steam, to be calculated by the standard formula for actual horse power; electricity to be calculated at the rate of 950 watts per horse power, petrol (gasoline) to be calculated by the following formula: $\frac{A \times R \times S}{C} = M P$. A is the area of piston or pistons measured in square inches, S is the stroke in feet, R is the number of revolutions per minute and C is a constant, 1,000 for four-cycle and 600 for two-cycle motors.

ENGLISH CLASSES.

The classes are as follows:

1. Yacht Dinghies, clinch built, not exceeding 15 feet over all.
2. Yacht Launches, clinch or carvel, not exceeding 20 feet.
3. Yacht Launches, clinch or carvel, not exceeding 25 feet.
4. Yacht Launches, clinch or carvel, not exceeding 30 feet.

The freeboard in all the foregoing classes to be not less than one quarter the minimum breadth.

In the open launch division there are three classes, A, 25 feet over all, B, 40 feet and C, 60 feet. There are no restrictions on breadth or freeboard, but all

Hydroleum burner was described by the London correspondent of THE AUTOMOBILE in the issue of November 22. It depends on alcohol or gasoline for starting and on jets steam injected in the atomized oil for continued operation.

boats in these classes must be rated in accordance with the Association's rating rule and time scale.

The following table of minimum breadth, the extreme breadth measured to the outside of the planking, has been adopted:

Lgth.	Breadth.	Lgth.	Breadth.
12 ft.	3 ft. 6 ins.	22 ft.	4 ft. 9 ins.
13 ft.	3 ft. 7 1-2 ins.	23 ft.	4 ft. 10 1-2 ins.
14 ft.	3 ft. 9 ins.	24 ft.	5 ft. — ins.
15 ft.	3 ft. 10 1-2 ins.	25 ft.	5 ft. 1 1-2 ins.
16 ft.	4 ft. — ins.	26 ft.	5 ft. 3 ins.
17 ft.	4 ft. 1 1-2 ins.	27 ft.	5 ft. 4 1-2 ins.
18 ft.	4 ft. 3 ins.	28 ft.	5 ft. 6 ins.
19 ft.	4 ft. 4 1-5 ins.	29 ft.	5 ft. 7 1-2 ins.
20 ft.	4 ft. 6 ins.	30 ft.	5 ft. 9 ins.
21 ft.	4 ft. 7 1-2 ins.		

AMERICAN AND ENGLISH RULES COMPARED

The adoption of a more complicated formula for American launches was considered necessary on account of the fact that while most of the English launches, for the present at least, are service boats, intended for cruising and ordinary running, there are already in this country some speed launches with power out of all normal proportion to their dimensions. The formula adopted by the American association is intended to reduce the rating to figures not greatly different from the length of hull. Another change has been made from the English rules in the method of measuring the midship section. In place of taking the actual section by the tedious and sometimes difficult process of docking the launch and fitting a mould to the planking, an approximate measurement will be obtained by locating the extreme breadth and measuring in one-fifth of this breadth, at which point the vertical distance to the outside of the planking (or to the inside with an allowance for the thickness of plank) will be measured. This latter is a mean depth which, multiplied by the breadth, gives very closely the area of section in all normal forms, whether wide and flat or of the conventional launch type. This method is as yet experimental, but if it gives satisfactory results in practice it will be far more rapid and convenient than the other.

Automobile Engineering Course.

A course in automobile construction is now offered by the Boston Young Men's Christian Association under the auspices of its evening institute. The work will consist of lectures upon the theory of automobile construction and the practical application of its problems, including the draughting, construction and operation of all types of automobiles, special attention being given to the explosion engine type. Only experienced draughtsmen will be allowed to take the course, although the lectures will be open to others. The course will also deal with the construction of all types of internal combustion motors.

Race and Tour Paris-Madrid.

Staff Correspondence.

PARIS, Feb. 20.—After the interdiction of the Pioule, Nice and Pau meetings the outlook seemed extremely dubious for the Paris-Madrid race, and though it scarcely seemed possible that the Government would go to the extent of forbidding the race on French territory when the King of Spain had already given his sanction the terms of the recent letter to the Automobile Club of Nice were so explicit that it was feared the Government had put its foot down on racing once and for all. Those who could read between the lines, however, did not look upon the situation in such a light. There is no doubt that the Government has suppressed all racing which is not carried out in the interests of the trade, but it will sanction a few events a year—probably two or three—organized by the Automobile Club of France or by the Association of Manufacturers.

Any uncertainty about Paris-Madrid has fortunately been dispelled by the official sanction which has been given this week. The race will be run through all the way from Paris to the Spanish capital, and nothing now stands in the way of arrangements being carried out. The industry has been relieved of an uncertainty which was becoming intolerable, for while manufacturers were building cars specially for the race they were in continual fear that this huge expenditure would be entirely thrown away. Several millions of francs are involved in the Paris-Madrid race. It only needed a word from the Government to say whether this money would be so much profit or loss. Fortunately the word is what the trade has been anxiously waiting for, and the millions will therefore fructify in the pockets of manufacturers.

On Sunday last terminated the period during which entries entitled competitors to ballot for positions, and henceforward all the vehicles entered will have to follow at the start in the order of reception. During the month that elapsed no fewer than 235 entries were received, so that the totals for all previous races are a long way exceeded. In Paris-Berlin there were only about 170 competitors and in Paris-Vienna a little more than 200, while during the first month of Paris-Madrid the number reached 235, and still the entries are coming in.

Each maker of course is anxious to start first because the leader always has an immense advantage over those who follow him. He has a clear road and a clear atmosphere, and can travel all the way at the highest possible speed. The man behind gets the dust, and unless by a very lucky chance—through a short stoppage of the leader for example—he has very little opportunity of passing. The dust is usually so thick that he has to keep prudently in the rear. If he makes

a dash he sees nothing around him. He is in a cloud of dust and only knows he is near the car by the small stones which tingle his face. He knows, too, that the leader is in the middle of the road. It's of no use sounding the horn, for the man in front can't hear, and he risks his life when he tries to blindly squeeze through between the car and the roadside. No wonder the stoutest heart falters when it comes to fighting an invisible rival in this cloud of dust and stones. The strain is too great, and the driver falls back again in the relatively clear air. The fortunes of a race depend upon accidents, for a minute's loss of time in jumping down to put something right may let another car pass and imperil the chances of winning.

It is for this reason that the balloting for positions arouses so much interest among makers. The first number was drawn by De Dietrich et Cie, and the second by Panhard et Levassor, and then followed Renault Frères, Decauville, Dietrich and the motor cyclist Haustgen. The first Mors will start seventh, and then will come Georges Richard, and Mr. H. S. Harkness is ninth. The foreign competitors comprise the Mercedes, Benz, the Belgian Pipe car, the Italian Fiat, S. F. Edge, John B. Warden, Foxhall Keene, Clarence Gray Dinsmore, Mark Mayhew, Ettiore Bugatti, Charles Jarrott, the Dutch Spyker car, Wolseley Tool and Motor Car Co., H. R. Kirk, J. A. Holder, J. Ernest Hutton, Mansfield Cumming and Ernest H. Arnott. Those who are toward the end of the list will have anything but a pleasant time of it if the roads are as dusty as they usually are in the merry month of May.

Articles of incorporation for the Mercedes company, of New York City, which will manufacture automobiles, launches and yachts have been filed at Albany. The capital of the concern is set at \$2,700,000. The organizers are: Edward Bernhard, Philip Ahrens, C. B. Wynkoop and James Arnold, of New York City; Philip Huetwohl, of Brooklyn; S. B. Smith, of Plainfield, N. J., and Theophilus Parsons, of Hempstead, L. I.

H. B. Larzelere, a San Francisco automobile dealer, takes his prospective purchasers for a 103-mile trip over the rough roads around San Francisco bay. One of these trips was made with but one stop, the actual running time for the trip being 4 hours and 20 minutes, and so successful was the performance of the American car with which the trip was made that an immediate sale was secured.

The Meteor steam car, made at Reading, Pa., is called the Saracen in England.